Fig. Color			No. of Project: Name of Project:	roject: Project:	žã	ilau	lang	No. 3 S. Empat	No. 4 Pd. Mahondan	ē	Left Bank	li	İ		No. 10 Small Scale
Lange Company Lange Compan	Work Items		Net krips Construct Unit	tion As tion Co Unit Co	^ -	4,295 ba 1,391 mil. Rp Cost			6,185 ha 7,905 mil. Cost	5,470 ha 0,836 mil. Rp Cost	4,320 he 17,716 mil. Rp Vol. Cost	4,190 he 44,383 mil. Rp Vol. Cost	2,425 ha 2,080 mil. Rp Cost	3,450 km 10,634 mil. Rp Coet	7,038
In this brightest In t		on and Compensation tive area area Dike	គ្ន ខ្	•	3.6 1.1 1.2			· ·	7			-1			1
1. 1. 1. 1. 1. 1. 1. 1.				L.S.		4 10,504.0			1 2,000.0	1 4,205.0	1	1 2,336.0	1 2,803.0	1 2,803.0	2,700.0
Secondary Care Enchance Enc	III. Impation system	E				55,807.5	0.0	0.0	30,641.2	105,045,5	0.0	20,231.8	11,837.9	17,256.7	26,856.8
1.5 Secondary Constitution 1.5 State	g ·	Earth work Structures Earth work Structures		_	24 E					80 W.		2.13			⊷ N
N. Denimop System A. D		7		L.S.		318.8 30,923.6 10,514.0		0.0				132.2 12,823.4			~
Laboration Earthwest Laboration Earthwest Laboration Earthwest Laboration Earthwest	≥ .	g	٠			23 462.4	13,327.0	6,723.5	13,653.9	105,896.2	8,118.5	7,782.0	5,879.3	7,589,4	13,160.1
Secondary Danish L.S. 70 212 148190 113 7,593.0 555 3485.0 122.2 8,624.0 1,040 72,800.0 60 4,200.0 691 4,837.0 45 3,220.0 52.8 3,696.0 113.4 Shouth at L.S. 2,637.0 1,040 7,04	7	·· ·· ·· ··	K K	L.S.	5 X	ų	ri.	8 8	-	2 3	.		H	. ≓	poli
Delitings Ghe Control Denitings Ghe Control Denitings Ghe Dositings Ghe Control Denitings Ghe Dositings Ghe Control Denitings Ghe Dositing System Development Dash	4.2 Secondary Drai Earth work Structures	<u>.</u>	ä	L.S.	8	212 14,819.0 5,038.5		55 3,850.0		1,040					
Tertiary System Development by 1.2 13,222.0 15,8664 5,755.0 6,906.0 2,800.0 3,860.0 4,015.0 1,204.5 2,800.0 5,185.0 7,422.0 4,456.0 6,185.0 7,422.0 4,456.0 6,185.0 7,422.0 4,456.0 6,185.0 7,422.0 4,456.0 6,185.0 7,422.0 6,185.0 7,422.0 1,204.5 1,204.0 5,184.0 6,185.0 1,204.5 1,204.0 1,204.5 1,204.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,204.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,204.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,205.0 1,204.5 1,205.0 1,205.0 1,204.5 1,205.0 1,	4.3 Drainage Gate Control Draina Flood Gate	ge Gate	50 G		52.5 40.5			-						3 1575 1 40.5	
Flood protection Work km L.S. 56 30,562.0 0 0.0 29 5,791.0 35 11,500.0 15 8,231.0 7 3,318.0 12 3,378.0 17 7,137.0 0 Other work 0.0		n Development lopment ion	五五			16,185.9 3,222.0 15,866.4 1,065.0 319.5		4	- 1	45,470.0	•]			1	
Other work Chart work 2 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0		n Work	Ħ	L.S.				- 1		` I:			•	- 1	
				L.S.	79		ŀ		-]	7	.		0.0	0.0	000

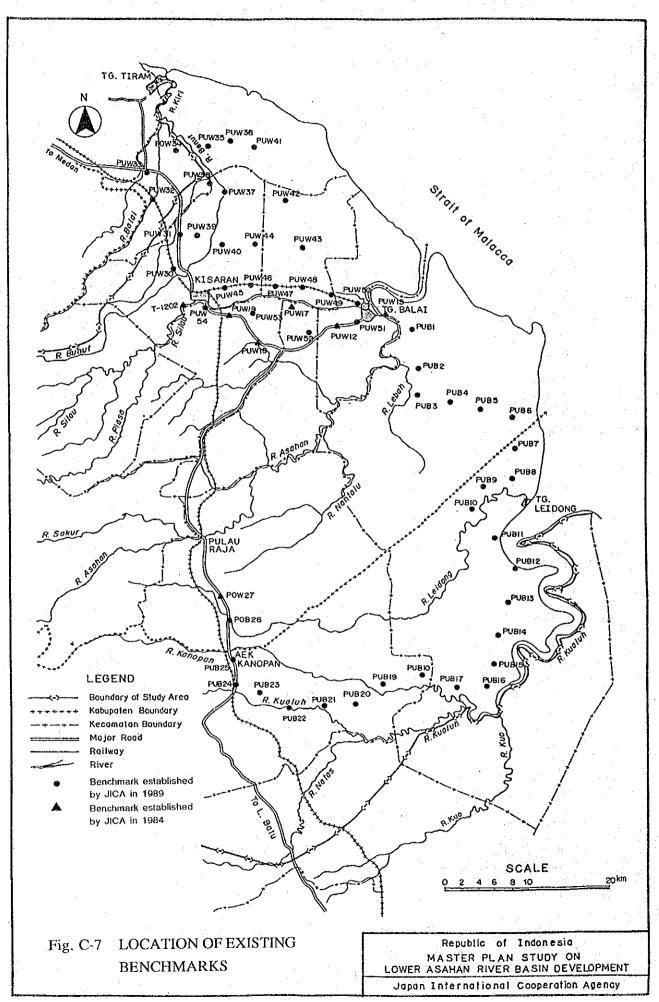
Table C-24(1/2) LIST OF BENCH MARK NETWORK (Silau-Bunut Area)

(The coodinates are in Zone47 of Universal Transverse Mercator grid system. The elevation are above mean sea level at Bagan Asahan.)

Code	X (m)	Y (m)	H (m)	Remarks
T 1202	566,484.430	328,447.200	43.784	Existing point
PUW 12	585,481.756	325,928.258	2.768	Established in 1984
PUW 17	580,269.903	328,420.522	5.892	п
PUW 18	575,633.409	324,340.436	11.076	H
PUW 19	573,006.550	327,314.477	13.231	u
PUW 30	565,573.797	333,127.598	18.760	Established in 1989
PUW 31	566,388.024	337,696.980	13.264	и
PUW 32	562,785.113	342,130.445	11.075	н
PUW 33	562,232.266	345,177.369	7.367	n
PUW 34	565,596.140	348,723.058	2.385	#
PUW 35	568,824.603	349,154.054	2.392	
PUW 36	572,014.897	349,566.329	2.123	n.
PUW 37	571,866.860	342,591.270	6.326	11
PUW 38	568,588.185	344,104.574	4.566	II.
PUW 39	568,299.268	337,612.961	10.841	1 u
PUW 40	571,978.972	336,612.961	10.198	n .
PUW 41	575,083.405	348,221.187	2.599	n n
PUW 42	578,737.038	342,056.874	3.514	n n
PUW 43	581,060.944	336,748.735	3.221	n.
PUW 44	575,780.663	337,151.230	9.103	tt .
PUW 45	571,630.427	330,749.656	15.002	H
PUW 46	575,402.700	331,180.058	11.833	H
PUW 47	578,568.470	331,046.902	7.355	n
PUW 48	580,927.089	330,936.783	6.197	n .
PUW 49	584,745.858	330,679.349	2.144	n o
PUW 50	587,864.895	329,103.684	30.160	u
PUW 51	588,157.075	327,086.017	2.302	u u
PUW 52	581,518.861	325,207,138	4.255	u.
PUW 53	575,019.763	327,888.008	10.891	\mathbf{u}_{i}
PUW 54	569,581.104	328,710.496	19.411	ü

Table C-24(2/2) LIST OF BENCH MARK NETWORK (Silan-Bunut Area)
(The elevation are above mean sea level at Bagan Asahan)

Code		Distance (km)	Elevation (m)	Remarks
PUW	15	2.4	2.805	Established in 1984
PUB	1	3.6	2.119	Established in 1989
PUB	2	6.9	2.591	n en
		3.6		
PUB	3	4.9	2.419	i u
PUB	4.		3.348	n
PUB	5	5.0	2.829	a
		3.6		ų
PUB	6	3.5	2.347	
PUB	7	3.1	2.692	u
PUB	8		2.835	
PUB	9	3.3	2.317	
		3.8		·
PUB	10	4.7	2.933	
PUB	11		2.954	u ,
PUB	12	4.4	2.693	n
PUB	13	3.7	3.820	•
ron	. 13	6.6		·
PUB	14	3.3	4.018	•
PUB	. 15		3.656	
PUB	16	3.2	3.024	. "
**.	•	3.8		vi
PUB	17	4.2	3.586	
PUB	18	5.8	2.993	u
PUB	19		4.869	· · ·
PUB	20	4.9	7.334	ır
	11.	3.3		
PUB	21	2.7	11.195	"
PUB	22	4.4	12.881	
PUB	23	4.3	20.620	•
	24	4.5	26.028	
PUB		5.3	1.	
PUB	25	4.3	20.813	. n
PUB	26		26.100	4,0
PUB	27	4.0	32.594	Established in 1984



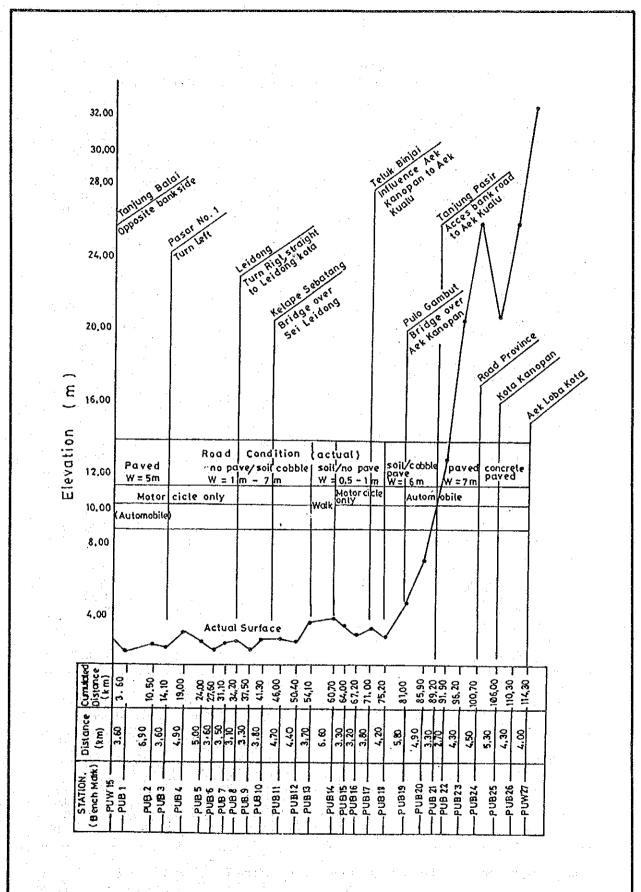


Fig. C-8 ROAD SURFACE PROFILE OF THE LINK ROAD

Republic of Indonesia
MASTER PLAN STUDY ON
LOWER ASAHAN RIVER BASIN DEVELOPMENT

Table C-25 DESIGN VALUE APPLIED FOR EARTH WORKS OF THE FLOOD CONTROL PROJECT

1. Embankment works

	Item	Lebah R.	Asahan R.	Silau R.
1.	Density			
	- Dry density (t/cu.m)	1.0	1.2	1.1
	- Wet density (t/cu.m)	1.55	1.55	1.60
	- Saturated density (t/cu.m)	1.66	1.8	1.7
	- Submerged density (t/cu.m)	0.6	0.8	0.7
2.	Shear Strength			
	- Cu (t/sq.m)	3.0	3.0	2.5
	- Pu (degree)	5	. : 5	5
3.	Permeability	· .		
	- Coefficient of permeability	5*10-5	5*10-5	1*10-3
	(k:cm/sec)			
4	Dimension of Levee			
	- Side slope	1:2	1:2	1:2
	- Extra embankment for consolidation	7.5-8.5	7.5-8.5	8.0-19.0
	settlement (% of total direct height)			

2. Foundation

	Item .	Lebah	Asahan	Silau
1.	Density			
	- Dry density (t/cu.m)	0.97	1.00	1.10
	- Wet density (t/cu.m)	1.55	1.60	1.65
	 Saturated density (t/cu.m) 	1.60	1.65	1.70
	 Submerged density (t/cu.m) 	0.60	0.65	0.70
2.	Shear Strength	· · · · ·		*
	- Cu (t/sq.m)	1.0	1.0	1.5
	- Pu (degree)	5 .	5	5
	- C' (t/sq.m)	0.30	0.35	0.30
	- Pu' (degree)	15	20	20
3.	Permeability			
	 Coefficient of permeability 			
	(k;cm/se zc)	5*10 ⁻⁵	5*10 ⁻⁵	5*10 ⁻⁵

3. Ultimate Bearing Capacity

(Unit:: t/.m² in square shape)

Item	Foundation Width	er e	 Dep	oth of Foundation	on (m)	
1(CIII	(m)	0	1	2	3	4
Lebah river	2-12	6.9	8.3	8.4	9.2	10.0
Asahan river	2-12	6.9	7.7	8.6	9.4	10.3
Silau river	2-12	10.3	11.2	12.2	13.1	14.0

Source: Design report on the Lower Asahan River Flood Control Project, DGWRD in 1989.

Table C-26 LOCATION OF CONCRETE AGGREGATES

Material	Site	Location	Remarks
Coarse aggregate	Bandar Pulau	about 15 km upstream of	20,000-30,000 m ³
		Pulau Raja	
	G. Pamela	about 20 km southwest	
	-	from Tebing Tinggi	
Fine aggregate (sand)	Riverbeds of th	e Asahan and Silau rivers	

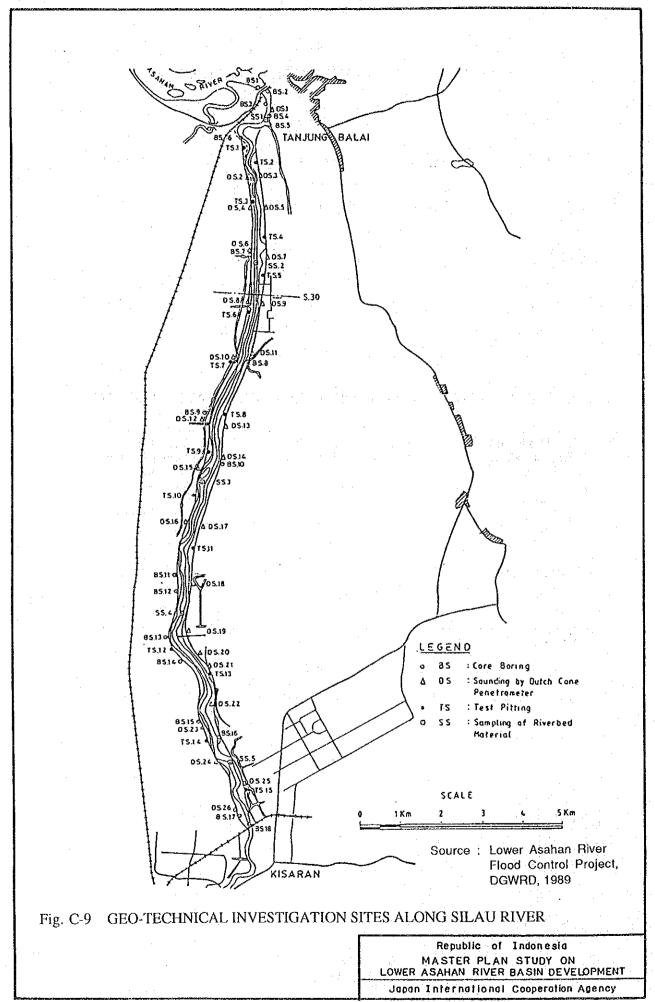
Table C-27 FOUNDATION CONDITION OF SILAU INTEGRATED WEIR SITE

Item/ Depth below Ground Surface (m)	Point Just Down- stream of Proposed Site	Point Just Up- stream of Proposed Site
Soil layer		
0- 5	- clay	 loose fine sand
5-10	- loose sand	 loose fine sand
10-15	- clay sand	- soft clay
Average N value		
0-5	- 4	- 9
5-10	- 12	- 12
10-15	- 4	- 6

Note:

Source: Detailed design of the Lower Asahan River Flood Control Project, DGWRD, 1988

¹⁾ Boring logs of the above 2 sites are given on Fig. C-10.



GEOLOGICAL RECORD OF BORE HOLE HOLE No. BS.17 PROJECT: DEPTH OF HOLE: 20.00 М LOCATION : IN SILAU RIVER **ELEVAT OF SURFACE:** M DATE STARTED: 25 JUN. 1988 ELEVAT OF HOLE BOY: М DATE COMPLETED: 27 JUN. 1988 INCLINATION OF HOLE : VERTICAL DIAMETER OF HOLE: DRILLED BY: MACHINE: GEOLOG, LOG BY: COLUMNAR ELEVATION THICKNESS HARDNESS CLASSIFI CATION OF ROCKS CORE RECOVERY DESCRIPTION COLOUR DEPTH DATI STANDARD PENETRATION TEST 10 20 30 40 50 60 DEPTH N/cm ЩЩ % 2 clay grey small 2 UNDISTUR 2 to amount of yellowish 5.00 sand grey 3 3 <u>Ψ</u> 4Ω 3.6x 10 k m/s 6 sandy 1.00 yellow clay ć 13 7 sand 4,00 8 8 loose 9 18 K = 1.5x 10 3 cm/S 10 10 clayey 6 11 grey sánd 3,00 12 12 loose 3 13 13 14 14 K=9.7×10⁻⁵cm/S 4 15 15 fine sand 16 16 7,00 17 6 17 18 18 7 19 19 Republic of Indonesia GEOLOGICAL RECORD OF Fig. C-10

BORE HOLE AT SILAU

INTEGRATED WEIR (1/2)

MASTER PLAN STUDY ON

LOWER ASAHAN RIVER BASIN DEVELOPMENT

Japan International Cooperation Agency

GEOLOGICAL RECORD OF BORE HOLE HOLE No. BS.18 DEPTH OF HOLE : PROJECT: 20.00 М ELEVAT OF SURFACE: М LOCATION: IN SILAU RIVER DATE STARTED: 10 JUL 1988 ELEVAT OF HOLE BOT : М INCLINATION OF HOLE : VERTICAL DATE COMPLETED: 11 JUL 1988 DIAMETER OF HOLE: DRILLED BY : HACHINE : GEOLOG. LOG BY: COLUMNAR SECTION HARDNESS THICKNESS CORE RECOVERY ELEVATION CLASSIFI CATION OF ROCKS DESCRIPTION COLOUR DEPTH STANDARD PENETRATION TEST 10 20 30 40 50 60 DEPTH NICH ЩЩ % 12 2 3 3 3 fine to medium 4 sand 5 11 5 11.20 grey 6 6 loose 11 7 8 8 9 9 13 10 10 11 3 11 12 12 yellowish clay brown 13 3 3.80 sätt 14 14นหมารานุคธย SAMPLING 4 15 15 16 16 clay 17 2 17 light 5.00 prown soft 18UN DISTURBED 18 3 19 19 20 GEOLOGICAL RECORD OF

Fig. C-10 GEOLOGICAL RECORD OF BORE HOLE AT SILAU INTEGRATED WEIR (2/2) Republic of Indonesia Master Plan Study on Lower Asahan River Basin Development

Japan International Cooperation Agency

ANNUAL SEDIMENT TRANSPORT CAPACITY Table C-28

(m³/year)

Site/item	Wash Load	Suspended/bed load	Total
. Silau river	166 700 (70)	400 700 (011)	£79 400 (290)
Kisaran	155,700 (78)	422,700 (211)	578,400 (289)
Tg. Balai	-	323,600 (162)	-
Balance		+99,100	•
. Asahan river			
Pulau Raja	201,800 (43)	210,000 (45)	411,800 (88)
Tg. Balai	·	197,100 (42)	- 1
Balance		+12,900	_ ·

Note;

Sediment transport capacity of the channels have been calculated by applying Brown formula.

Source: Part-1 Study in 1985

Table C-29 **GRAIN SIZE DISTRIBUTION**

Percent finer by weight	Mean grain	size (mm)
(%)	Kisaran	Pulau Raja
90	1.53	1.28
85	1.36	1.17
65	0.81	0.84
50	0.62	0.69
35	0.49	0.57
	(1.52)	(1.47)

Note;

() indicates uniformity coefficient of grain size.

Source

Design Report on River Improvement Works, Lower Asahan River Flood Control Project, DGRWD, June, 1989

^() indicates ppm in unit.+ indicates deposit in the riverbed.

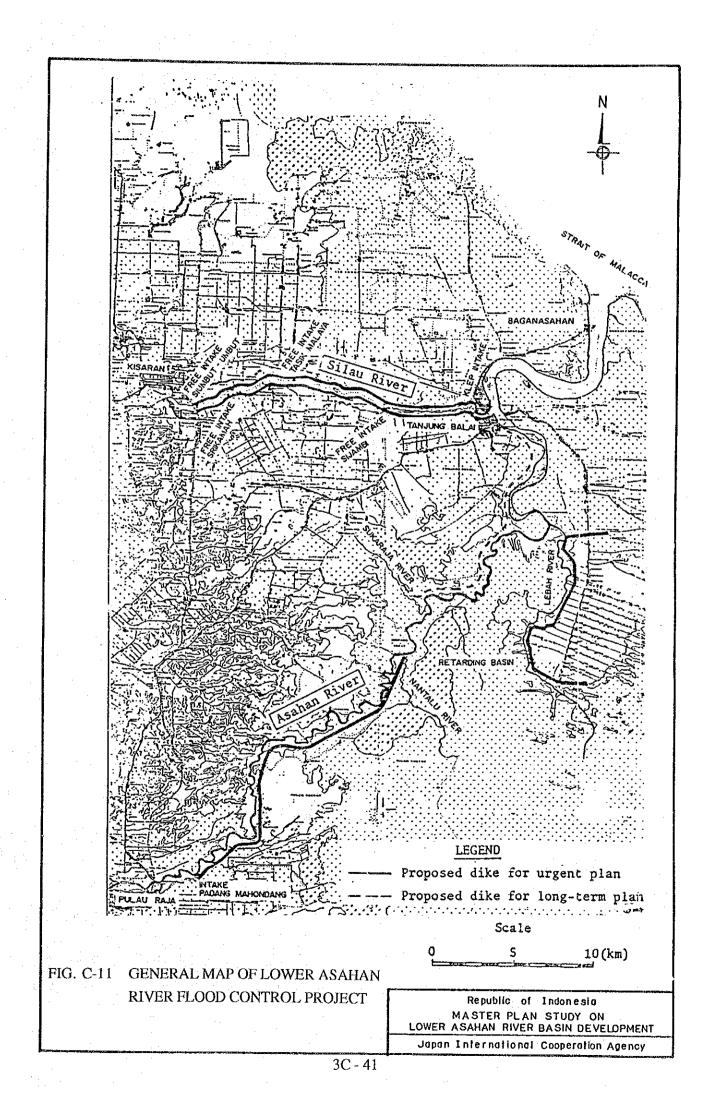
MAIN FEATURES OF PROJECT WORKS FOR THE LOWER Table C-30 ASAHAN RIVER FLOOD CONTROL PROJECT BY DGWRD

	•	C	bjective Rivers	
	Item	Asahan R.	Lebah R.	Silau R.
1.	Design flood - Return period - Design discharge (cu.m/s)	10 yr 1,100	10 yr	10 yr 600
2.	Length to be improved (km)	17.2	15.2	20.0
3.	Major proposed works - Excavation/dredging (1,000 cu/m) - Embankment (1,000 cu.m) - Revetment (m) - Parapet wall (m)	3,591 758	238	2,222 1,250 3,130
4.	Land acquisition and compensation			
	- Land (1,000 sq.m) - House (nos) - Tree (nos)	3,188 47 2,000	470 20	3,026 545 34,100

Note:

- Based on the results of both the Part-1 Study in 1985, the Government of Republic of Indonesia (GOI) decided to carry out the detailed design of the Lower Asahan River Flood 1) Control Project, with the loan of the Overseas Economic Cooperation Fund(OECF), Japan
- The design was proceeded for 15 months from March 1988 to June 1989. 2)
- 3) Project Cost:

Cost: Rp. 107,650 mill. (1989 price level)
F/C: 72,630 mill.
L/C: 35,020 mill.
US\$1.0 = ¥130 = Rp. 1,750



Agricultural Development Plan

Appendix 3-D

Project Description Sheet

Appendix 3-D PROJECT DESCRIPTION SHEET

CONTENTS

		<u>Page</u>
1.	Silau-Bunut River Basin Integrated Rehabilitation Irrigation Project	3D-1
2.	Tambung Tulang Swamp Development Project	3D-7
3.	Simpang Empat Swamp Development Project	3D-13
4.	Padang Mahondang Irrigation Extension Project	3D-19
5.	Leidong Asahan Swamp Development Project	3D- 2 5
6.	Kanopan Left Bank Drainage Improvement Project	3D-31
7,	Aek Natas Irrigation Project	3D-37
8.	Kualuh Right Bank Irrigation Project	3D-43
9.	Aek Naetek Irrigation Project	3D-49
10.	Small-scale Irrigation Rehabilitation Package Project	3D-55

PROJECT DESCRIPTION SHEET

SUMMARY

1.1 Name of Project: SILAU-BUNUT RIVER BASIN INTEGRATED

REHABILITATION IRRIGATION PROJECT

1.2 Type of Project: Irrigation water resource development/Irrigation and drainage

development

1.3 Location:

Kabupaten:

Asahan

Kecamatan:

Tg.Tiram, Meranti, Air Joman, Tg.Balai, Buntu

Pane, Air Batu

1.4 Project Area:

17,000 ha in gross

1.5 Proposed Agricultural Development Plan

Proposed cropping pattern

Double Cropping of Paddy

Cropping intensity

200 %

Irrigation area

14,300 ha in net

Non irrigation area

2,700 ha

1.6 Proposed Key Facilities

i) Integrated diversion weir on the Sllau river

ii) Inter-basin canal networks for diverting irrigation water to Bunut river system from the Silau river

iii) Rehabilitation and extention of the existing irrigation and drainage facilities

1.7 Project Financial Cost

204,600 million Rp.

(Price contingency is not included)

1.8 Economic Annual

18,690 million Rp.

Incremental Project Benefit

1.9 Economic Viability

EIRR:

13.2 %

B/C:

1.32 at 10% interest rate

1.10 Proposed Implementation Period:

(including study, design and fund

7 years

arrangement period)

II. PRESENT CONDITIONS OF THE PROJECT AREA

2.1 Socio-economic Conditions in 1988

46,100 persons (1)Total population 8,500 nos Number of household (2)

5.4 persons Family size(average) (3)

1.1 ha/farm household Land holding size (average) (4) 1.1 mil/household/year Farm Income level(average) (5)Rp.

2.2 Natural Conditions

Coarse to fine textured soils, partly covered (1) Soil condition: with organic soils (peat)

Flat Topography (3)Altitude El. 15-2m

1,640 mm/year (4) Mean Annual rainfall:

1,547 mm/year (5)5-year low annual rainfall:

2.3 Agricultural Activities

Cropping area and unit yield of Paddy

WP	DP	RP	Total
6,940	4,164	6,290	17,394
			•
	1		

(Unit yield, ton/ha) 4.0 2.0 4.0

WP: Irrigated Wet Season Paddy RP: Rainfed paddy field

DP: Irrigated Dry Season Paddy

Use of fertilizer: High in irrigated paddy (I/P), extremely low in rainfed paddy (R/P) (2)

Use of chemicals: Common in IP/RP (3)

(4) Use of farm machinery: Non

(5) Present land use (ha in Gross)

		and the second second			
Súb-area	Irrigated Sawah	Rainfed Sawah	Swamp area	Others	Total
1 Silau river system					
(1) PU Area	3,145	920	0	635	4,700
(2) Non-PU Area	0	2,375	0	0	2,375
Sub-total	3,145	3,295	0	635	7,075
2 Bunut river system					
(1) PU Area	4,490	330	0	885	5,705
(2) Non-PU Area	0	4,220	0	0	4,220
Sub-total	4,490	4,550	0	885	9,925
:					
Total	7,635	7,845	0	1,520	17,000

2.4 Existing Infrastructure

(1) Irrigation and drainage facilities

Sub-area	Irrigation canal (km)	Drainage canal (km)	Farm road (km)	Flood dike (km)	Related structures (nos)
Silau river system (PU)	60	.8 36.1	0.4	28.0	88.0
Bunut river system (PU)	45	.2 39.8	0.0	17.5	86.0
情况。 · · · · · · · · · · · · · · · · · · ·					
Total	106	.0 75.9	0.4	45.5	174.0
Domestic water supply Electric supply	· · · · · · · · · · · · · · · · · · ·	·			
Other key facilities					

2.5 Flood Conditions

(3) (4)

(1)	Area affected by 10-yr flood:	8,500	ha
	(standing water depth more than 30 cm		
	for more than 1 day)		

Degree of flood: (2)

(i) Average stand.water depth

: 0.6 - 1.0

(ii) Average duration

: 3-6 days

III. MAIN CONSTRAINTS OF THE AREA

- (#) Lack of irrigation water supply(#) Suffered by seasonal river flooding(#) Pest and diseases
- (#) Poor drainability
- (#) Others, if any;

Poor O&M activity

IV. PROPOSED DEVELOPMENT PLAN

4.1 Agricultural Development Plan

(1) Land use plan

			<u> </u>	(unit: ha)
1 4 1	11	La	nd Use Plan		
Present land use	Net Irrigated Sawah	Net Rainfec Sawah	Oil Palm	Others*	Total
Irri. Sawah	6,940		-	695	7,635
Rainfed Sawah	6,290	-		1,555	7,845
Swamp					0
Others	1,065			455	1,520
Total	14,295			2,705	17,000

^{*} Others includes canals, roads, house yard, etc.

(2) Cropping pattern:

Double crop of paddy

(3) Cropping intensity:

200%

(4) Target yield

(i) Wet season paddy: 5.0 - 5.5 ton/ha (ii) Dry season paddy: 5.0 - 5.5 ton/ha (iii) Other crop: ton/ha

4.2 Related development plan

- (1) Development plan of DPU in Pelita V
 - (i)DPU North Sumatera Province intends to realise the project.
- (2) Transmigration program to be expected
 - (i) Objective area

0 ha

- (ii) Numbers of transmigrates; Non person
- (3) River improvement works
 - (i) Detailed design of flood control work for the Silau river has been completed in June 1989. The final arrangement for the work has been commenced by DGWRD

4.3 Proposed Project Works

- (1) Principal Features of Project Works
 - (i) Irrigation system

 Water source development 	:Si	lau river, Bunut r	iver	
- Diversion structure	:Si	lau Integrated we	ir, Silau diversion	weir, S. Serani weir
 Irrigation canals 	New:	367 km,	Improved:	37 km
(ii) Drainage canals	New:	245 km,	Improved:	10 km
(iii) Flood protection dike	New:	56 km,	Improved:	0 km
(iv) Farm road	New:	614 km,	Improved:	47 km
(v) On-farm facilities		13,222 ha	•	
(vi) Land reclamation		1.065 ha		

() Others;

	COST ESTIMATE	

			*	
5.1 Land	and Compensation Cost	Rp.	5,069 million	200 per USS /ha
	y and Design Costs (5 % of Item 5.3 (1))	Rp.	6,820 million	269 per US\$ /ha
5.3 Const	ruction Cost T	OTAL NET	IRRI. AREA	14,300 HA
(1)	Direct construction cost	O THE HET	71(111.711(12.41)	11,500 1111
(i)	Irrigation and drainage facilities	Rp.	89,800 million	3,543 per US\$ /ha
(ìi)		Rр.	30,400 million	1,201 per US\$ /ha
(ìii)		Rp.	16,200 million	640 per US\$ /ha
	Sub-total (1)	Rp.	136,400 million	5,389 per US\$ /ha
(2)	Physical contingency (30 % of Item (1))	Rp.	40,920 million	1,617 per USS /ha
(3)	Sub-total of Items (1)+(2)	Rp.	177,320 million	7,006 per US\$ /ha
(4)	Tax on Civil Works(VAT) (10 % of Item 5.3-(3))	Rp.	17,732 million	701 per US\$ /ha
	Total of Item 5.3	Rp.	177,320 million	7,006 per US\$ /ha
5.4 Cost o	of the Consultants Services (10 % of total cost of Item 5.3-(1))	Rp.	13,640 million	539 per US\$ /ha
	nistration Cost of the	Rp.	1,773 million	70 per US\$ /ha
GOVEI	(1 % of total cost of Item 5.3)			
5.6 Price	contingency	Rp.	0 million	0 per US\$ /ha
	and the second of the second o	•		
5.7 Total	Cost of the Project	Rp.	204,622 million	8,084 per US\$ /ha

VI. IMPLEMENTATION SCHEDULE

6.1 Survey and design

1.5 Years

6.2 Construction schedule

5 Years

6.3 Executing agency

DGWRD-DPU

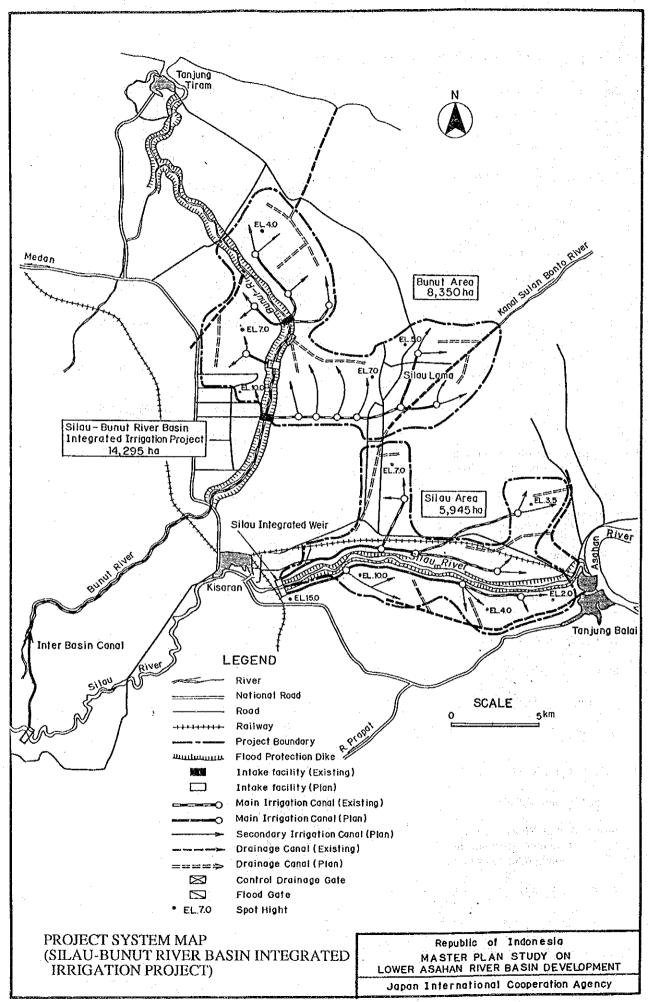
VII. PROJECT EVALUATION

7.1 Proje	ect Economic Cost	Rp.	159,650 million
7.2 Proje	ect Annual Economic Benefit	.÷	
(1)	Irrigation development	Rp.	18,690 million
(2)	Flood protection works	Rp.	6,639 million

7.3 Economic viability

EIRR: B/C : 13.2 %

1.32 (at 10 %)



PROJECT DESCRIPTION SHEET

I. SUMMARY

1.1 Name of Project: TAMBUNG TULANG SWAMP DEVELOPMENT PROJECT

1.2 Type of Project: Swamp development / Drainage improvement

1.3 Location:

Kabupaten:

Asahan

Kecamatan:

Tg.Tiram

1.4 Project Area:

7,500 ha in gross

1.5 Proposed Agricultural Development Plan

- Proposed cropping pattern

Single crop of paddy

Cropping intensity

100 %

- Irrigation area

5,800 ha in net

Non irrigation area

1,700 ha

1.6 Proposed Key Facilities

i) Constructing drainage canals and related structures

ii) Land reclamation of swamp area

1.7 Project Financial Cost

Rp. 31,000 million

(Price contingency is not included)

1.8 Economic Annual

Rp. 3,090 million

Incremental Project Benefit

1.9 Economic Viability

EIRR:

9.9 %

B/C:

0.99 at 10% interest rate

1.10 Proposed Implementation Period :

(including study, design and fund

arrangement period)

5 years

II. PRESENT CONDITIONS OF THE PROJECT AREA

2.1 Socio-economic Conditions in 1988

19,300 persons Total population (1)3,600 nos (2)Number of farm household (3)

5.3 persons Family size(average)

Land holding size (average) 1.1 ha/farm household (4)0.76 mil/household/year Farm Income level(average) Rp.

2.2 Natural Conditions

Fine textured soils, partly covered with peat Soil condition: (1)

(2)Topography Flat

El. 5-2m Altitude (3)1,640 mm/year (4) Annual rainfal 5-year low rainfall: 1,547 mm/year

2.3 Agricultural Activities

Cropping area and unit yield of Paddy

'				
Sub-area	WP	DP	RP	Total
(Cropping area, ha)		-	4,040	4,040
				A STATE OF THE STA
(Unit yield, ton/ha)				
(Onit) with ton hilly				

2.0

RP: Rainfed paddy field WP: Irrigated Wet Season Paddy DP: Irrigated Dry Season Paddy

(2) Use of fertilizer: Limited Common Use of chemicals:

(3)(4) Use of farm machinery: Non

(5) Present land use (ha in Gross)

Sub-arca	Irrigated Sawah	Rainfed Sawah	Swamp area	Others	Total
1 DP Tambung Tulang	0	5,050	0	0	5,050
2 Non-PU area	0	0	2,450	. 0	2,450
Total	0	5,050	2,450	0	7,500

2.4 Existing Infrastructure

(1) Irrigation and drainage facilities

Sub-area	Irrigation canal (km)	Drainage canal (km)	Farm road (km)	Flood dike (km)	Related structures (nos)
DP, Tambung Tulang	0.0	7.0	0.0	0.0	1
Domestic water supply Electric supply					
Other key facilities Conditions		·			

2.5 Floor

- (1) Area affected by flood (standing water depth more than 30 cm for more than 1 day)
- Degree of flood: (2)
 - (i) Average stand.water depth :(ii) Average duration :

1.0 m

3 days

III. MAIN CONSTRAINTS OF THE AREA

- 1	אוממו ו	Λŧ	teriantion	sunfor cump	133
	1 1.24L.K		34 1 155 (3211 321	water supp	ıΥ

- Suffered by seasonal flooding
- (#) Pest and diseases
- (#) Poor drainability
- Others, if any ; (#)

Poor Access in wet season

IV. PROPOSED DEVELOPMENT PLAN

4.1 Agricultural Development Plan

 Land use pla

			all years on the	250.25	(unit: ha)
		La	nd Use Plan		
Present land use	Net Irrigated	Net Rainfed	Oil Palm	Others*	Total
	Sawah	Sawah			<u> </u>
Irri. Sawah					0
Rainfed Sawah	· · · · · · · · · · · · · · · · · · ·	4,040		1,010	5,050
Swamp		1,715	_	735	2,450
Others			· _ ·		0
Total		5,755		1,745	7,500

^{*} Others includes canals, roads, house yard, etc.

(2) Cropping pattern: Single crop of paddy a year

Cropping intensity: (3)

100 %

(4) Target yield

(i) Wet season paddy: 4.0 ton/ha (ii) Dry season paddy:

ton/ha

(iii) Other crop :

ton/ha

4.2 Related development plan

Development plan of DPU in Pelita V and VI

(i) Development is scheduled by Dept. of Swamp Development, DPU North Sumatera Province

(2)Transmigration program to be expected

(i) Objective area:

1,745 ha

(ii) Numbers of transmigrates; 1,700 families

River improvement works: Non

Principal Features of Project Works

(i) Drainage canals

New: 137 km, Improved: 7 km

(ii) Farm road

New: 137 km, Improved: 7 km

(iii) On-farm facilities

5,755 ha

(iv) Land reclamation of swamp area

1,715 ĥa,

() Others;

4.3 Proposed Project Works

V. PROJECT COST ESTIMATE (FINANCIAL COST)

5.1 Land a	nd Compensation Cost	Rp.	708 milli	on 70	per US\$/ha
_	and Design Costs (5 % of Item 5.3 (1)) uction Cost	Rp.	1,035 milli	on 102	per US\$/ha
(1)	Direct construction cost	TOTAL GROSS	AREA millio	on 5,750	НА
(i) (ii)	Drainage facilities On-farm and land reclamation	Rp. Rp.	13,300 millio 7,400 millio		per US\$ /ha per US\$ /ha
-	Sub-total (1)	Rp.	20,700 millio	on 2,034	per US\$/ha
(2)	Physical contingency (30 % of Item (1))	Rp.	6,210 millio	on 610	per US\$/ha
(3)	Sub-total of Items (1)+(2)	Rp.	26,910 millio	on 2,644	per US\$/ha
(4)	Tax on Civil Works(VAT) (10 % of Item 5.3-(3))	Rp.	2,691 millio	on 264	per US\$/ha
	Total of Item 5.3	Rp.	26,910 millio	on 2,644	per US\$/ha
5.4 Cost of	the Consultants Services (10 % of total cost of Item 5.3-(Rp.	2,070 millio	on 203	per US\$/ha
5.5 Admin Govern		Rp.	269 millio	on 26	per US\$/ha
5.6 Price co	(1 % of total cost of Item 5.3)	Rp.	0 millio	on ()	per US\$/ha
1	Cost of the Project	-	30,992 millio		per ha
5.7 TOTAL	Lost of the Project	Rp.	JU,772 IIIIII	ш 5,045	рег на

VI. IMPLEMENTATION SCHEDULE

6.1 Survey and design 1.5 Years

6.2 Construction schedule 3.5 Years

6.3 Executing agency DGWRD-DPU

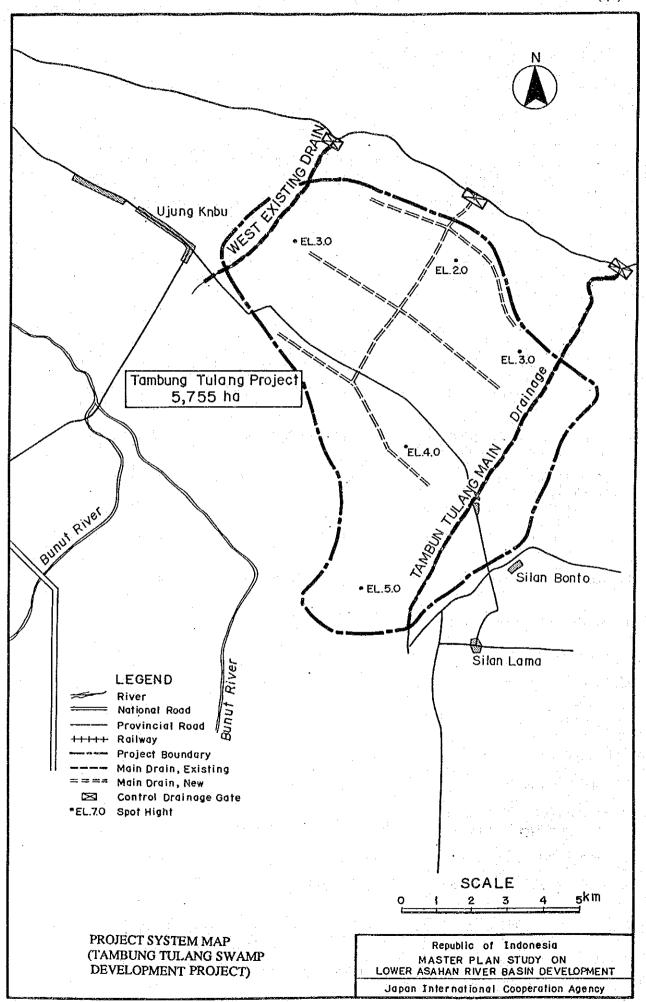
VII. PROJECT EVALUATION

7.1 Project Economic Cost Rp. 24,230 million

7.2 Project Annual Economic Benefit
(1) Irrigation development Rp. 3,090 million

7.3 Economic viability

EIRR: 9.9 % B/C: 0.99 (at 10 %)



PROJECT DESCRIPTION SHEET

I. SUMMARY

1.1 Name of Project: SIMPANG EMPAT SWAMP DEVELOPMENT PROJECT

1.2 Type of Project: Swamp development / Drainage development

1.3 Location:

Kabupaten:

Asahan

Kecamatan:

Simpang Empat, Tg. Balai

1.4 Project Area:

4,000 ha in gross

1.5 Proposed Agricultural Development Plan

- Proposed cropping pattern

Single cropping of paddy

- Cropping intensity

100 %

Irrigation area

2,800 ha in net

Non irrigation area

1,200 ha

1.6 Proposed Key Facilities

i) Construction of a drainage network and flood prevention dike

ii) Land reclamation of swamp area.

1.7 Project Financial Cost

(Price contingency is not included)

Rp. 26,000 million

1.8 Economic Annual

Incremental Project Benefit

Rp. 2,150 million

1.9 Economic Viability

EIRR:

9.6 %

B/C:

0.96 at 10% interest rate

1.10 Proposed Implementation Period:

(including study, design and fund

arrangement period)

5 years

II. PRESENT CONDITIONS OF THE PROJECT AREA

2.1 Socio-economic Conditions in 1988

(1) Total population - persons
(2) Number of farm household - nos

(3) Family size(average) - persons

(4) Land holding size (average) - ha/farm household (5) Income level(average) Rp. - /household/year

2.2 Natural Conditions

(1) Soil condition : Fine texture soils partly covered with peat

(2) Topography : Flat (3) Altitude : El. 6-3 m

(4) Annual rainfal : 2,435 mm/year (5) 5-year low rainfall : 2,134 mm/year

2.3 Agricultural Activities

(1) Cropping area and unit yield of Paddy

Sub-area WP	DP	RP	Total
(Cropping area, ha)			

(Unit yield, ton/ha)

WP: Irrigated Wet Season Paddy	RP: Rainfed paddy field	
DP: Irrigated Dry Season Paddy		

(2) Use of fertilizer:

Non

(3) Use of chemicals: Non (4) Use of farm machinery: Non

(5) Present land use (ha in Gross)

	Sub-area	Irrigated Sawah	Rainfed Sawah	Swamp area	Others	Total
1 Rawa Si (Non-PU	impang Empat U area)	0	0	4,000	0	4,000
Total		0	0	4,000	0	4,000

2.4 Existing Infrastructure

Irrigation and drainage facilities (1)

. ***		Sub-area	Irrigation canal (km)	Drainage canal (km)	Farm road (km)	Flood dike (km)	Related structures (nos)
			•	•	. - .	4.0	-
						. •	
1	Domestic wa Electric supp Other key fa	oly				<i>;</i>	

2.5 Flood Conditions

(3)

Area affected by flood 4,000 ha (1) (standing water depth more than 30 cm for more than 1 day) Degree of flood:

(2)

(i) Average stand.water depth: 0.6 m (ii) Average duration: 7 days

III. MAIN CONSTRAINTS OF THE AREA

	Lack of irrigation water st	ірріу
(#)	Suffered by seasonal river	flooding
()	Pest and diseases	
()	Poor drainability	•
(11)	Others if one	Poor Accessabil

0 km0 km0 km

IV. PROPOSED DEVELOPMENT PLAN

4.1 Agricultural Development Plan

((1)	 Land	use	plan

				(<u>unit: ha)</u>
	Land Use Plan				
Present land use	Net Irrigatedl Sawah	Net Rainfed Sawah	Oil Palm	Others*	Total
Irri, Sawah Rainfed Sawah		_	<u>-</u>	·	0
Swamp	—. —	2,800		1,200	4,000
Others Total		2,800		1,200	4,000

^{*} Others includes canals, roads, house yard, etc.

(2) Cropping pattern: Single crop of paddy in wet season

Cropping intensity:

100 %

(3) (4) Target yield

(i) Wet season paddy: 4.0 ton/ha (ii) Dry season paddy: ton/ha (iii) Other crop: ton/ha

- 4.2 Related development plan
 - Development plan of DPU in Pelita V
 - (i) A part of the area is scheduled to be developed by Dept. of Swamp Development, DPU Nourth Sumatera Province
 - (2) Transmigration program
 - (i) Objective area:

2,800 ha

- (ii) Numbers of transmigrates; 2,800 families
- River improvement works
 - (i) Long term improvement plan was proposed in Part-1 study

4.3 Proposed Project Works

(1)	Principal Features of Project				
	(i) Drainage canals	New:	70 km,	Improved:	
	(ii) Flood protection dike	New:	30 km,	Improved:	
	(iii) Farm road	New:	70 km,	Improved:	
	(iv) On-farm facilities		2,800	ha	
	(v) Land reclamation of swar	2,800	ha		
	() Others;	_			

V. PROJECT COST ESTIMATE (FINANCIAL COST)

5.1 Land and Compensation Cost	Rp.	1,299 million	262 per US\$/ha	
5.2 Survey and Design Costs (5 % of Item 5.3 (1))	Rp.	835 million	168 per US\$/ha	
5.3 Construction Cost	TAL NET II	DDI ADEA	2,800 HA	
(1) Direct construction cost	IALNELI	KKI AKEA	2,000 HA	
(i) Drainage facilities	Rp.	6,700 million	1,352 per US\$ /ha	
(ii) Flood prevention works	Rp.	5,800 million	1,170 per US\$ /ha	
(iii) On-farm and land reclamation	Rp.	4,200 million	847 per US\$ /ha	
Sub-total (1)	Rp.	16,700 million	3,370 per US\$/ha	
(2) Physical contingency (30 % of Item (1))	Rp.	5,010 million	1,011 per US\$/ha	
(3) Sub-total of Items (1)+(2)	Rp.	21,710 million	4,381 per US\$/ha	
(4) Tax on Civil Works(VAT) (10 % of Item 5.3-(3))	Rp.	2,171 million	438 per US\$/ha	
Total of Item 5.3	Rp.	21,710 million	4,381 per US\$/ha	
5.4 Cost of the Consultants Services (10 % of total cost of Item 5.3-(1))	Rp.	1,670 million	337 per US\$/ha	
5.5 Administration Cost of the Government (1 % of total cost of Item 5.3)	Rp.	217 million	44 per USS/ha	
5.6 Price contingency	Rp.	0 million	0 per US\$/ha	
5.7 Total Cost of the Project	Rp.	25,731 million	5,192 per US\$/ha	

VI. IMPLEMENTATION SCHEDULE

6.1 Survey and design 2 Years

6.2 Construction schedule 3 Years

6.3 Executing agency DGWRD-DPU

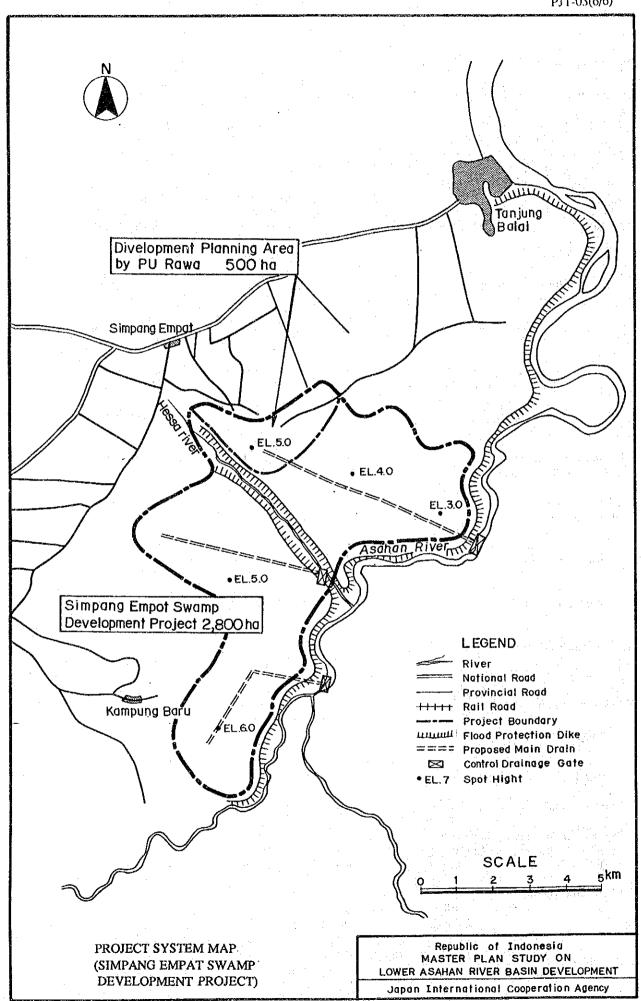
VII. PROJECT EVALUATION

7.1 Project Economic Cost		ĸp.	19,545 mmm	
7.2 Proje	ct Annual Economic Benefit	ž.	. *	
(1)	Irrigation development	Rp.	2,150 million	
(2)	Flood protection works	Rp.	0 million	

7.3 Economic viability

IRR: 9.6 %

B/C : 0.96 (at 10 %)



I. SUMMARY

1.1 Name of Project : PADANG MAHONDANG IRRIGATION EXTENTION PROJECT

1.2 Type of Project: Rehabilitation and extention works / Swamp development

1.3 Location:

Kabupaten:

Asahan

Kecamatan:

Pulau Rakyat

1.4 Project Area:

8,300 ha in gross

1.5 Proposed Agricultural Development Plan

- Proposed cropping pattern

Double crop of paddy

- Cropping intensity

200 %

- Irrigation area

6,200 ha in net

Non irrigation area

2,100 ha

1.6 Proposed Key Facilities

i) Augentation of irrigation water supply to the area by constructing a new division structure upstream the existing one.

ii) Rehabilitation and extention of irrigation and drainage networks in the existing paddy field.

iii) Reclamation of swamp area providing with irrigation and drainage networks.

iv) Flood preventation dike along the Asahan and Nantalu rivers and related facilities.

iv) Provision of farm road network.

1.7 Project Financial Cost

Rp. 99,000 million

(Price contingency is not included)

1.8 Economic Annual

Rp. 10,300 million

Incremental Project Benefit

1.9 Economic Viability

EIRR:

12.2 %

B/C:

1.21 at 10% interest rate

1.10 Proposed Implementation Period: (including study, design and fund arrangement period)

6 years

II. PRESENT CONDITIONS OF THE PROJECT AREA

2.1 Socio-economic Conditions in 1988

Total population 13,200 persons (1)(2) Number of farm household 2.700 nos Family size(average) (3)4.9 persons

Land holding size (average) 0.8 ha/farm household (4)

FarmIncome level(average) Rp. 1.1 mil/household/year

2.2 Natural Conditions

Soil condition Medium to fine textured soils, partly covered with peat (1)

(2)Topography Flat Altitude (3)El. 10-5m

2,435 mm/year Annual rainfal 2,134 mm/year (5)5-year low rainfall:

2.3 Agricultural Activities

(1) Cropping area and unit yield of Paddy

Sub-area	WP	DP	RP	Total
(Cropping are	a, ha)		1	
	1,100	660	1,170	2,770

(Unit yield, ton/ha) DP Pd. Mahondang 2.0 4.0 4.0

> WP: Irrigated Wet Season Paddy RP: Rainfed paddy field DP: Irrigated Dry Season Paddy

Use of fertilizer (2): Considerable in Irrigated areas, limited in Rainfed areas

(3) Use of chemicals : Common Use of farm machinery (4) : Non

Present land use (ha in Gross) (5)

Sub-area	Irrigated Sawah	Rainfed Sawah	Swamp area	Others	Total
1 DP Pd. Mahondang	1,100	1,400	0	830	3,330
2 Rawa Nantalu (Non-PU)	0 :		4,910	0	4,970
Total	1,100	1,460	4,910	830	8,300

2.4 Existing Infrastructure

(1) Irrigation and drainage facilities

Sub-area	Irrigation	Drainage	Farm	Flood	Related
	canal	canal	road	dike	structures
	(km)	(km)	(km)	(km)	(nos)
DP Pd. Mahondang	12.4	16.0	0.0	10.0	24

(2)	Domestic water supply			:
(3)	Electric supply			
(4)	Other key facilities	 4.1		

2.5 Flood Conditions

(1) Area affected by flood : 8,300 ha (standing water depth more than 30 cm for more than 1 day)

(2) Degree of flood:

(i) Average stand.water depth:

0.6 m

(ii) Average duration:

7 days

III. MAIN CONSTRAINTS OF THE AREA

- (#) Lack of irrigation water supply
- (#) Suffered by seasonal river flooding
- (#) Pest and diseases
- (#) Poor drainability
- (#) Others, if any; Poor accessibility

4.1 Agricultural Development Plan

Land use plan (1)

<u> </u>			· · · · · · · · · · · · · · · · · · ·	(<u>unit: ha)</u>
		La	nd Use Plan	4	<u> </u>
Present land use	Net Irrigated	let Rainfed	Oil Palm	Others*	Total
	Sawah	Sawah		7,75,45	
Irri. Sawah	1,000			100	1,100
Rainfed Sawah	1,168			292	1,460
Swamp	3,437		_	1,473	4,910
Others	580			250	830
Total	6,185			2,115	8,300

^{*} Others includes canals, roads, house yard, etc.

(2)Cropping pattern: Double crop of paddy

Cropping intensity: (3)

200 %

(4) Target yield

(i) Wet season paddy:

5.0 ton/ha

(ii) Dry season paddy:

5.0 ton/na

(iii) Other crop :

ton/ha

4.2 Related development plan

Development plan of DPU in Pelita V (1)

(i) Rehabilitation and extension work for the existing scheme

(2)Transmigration program

(i) Objective area

3,400 ha in Net,

(ii) Numbers of transmigrates; 3,400 families

(3) River improvement works

(i) Urgent flood control project; Detailed design work has been completed in June, 1989

4.3 Proposed Project Works

(1) Principal Features of Project Works

(i) Irrigation system

- Water source development	A:	sahan	
- Diversion structure	A:	sahan free intake (new)	The state of the s
- Irrigation canals	New:	204 km, Improved:	12 km
(ii) Drainage canals	New:	139 km, Improved:	12 km
(iii) Flood protection dike	New:	29 km, Improved:	0 km
(iv) Farm road	New:	343 km, Improved:	. 13 km
(v) On-farm facilities		6,185 ha	
(vi) Land reclamation of swamp area		4,015 ha	
() Others;			

٧.	PROJECT	COST ESTIN	MATE	(FINANCIAL	COST)
----	---------	------------	------	------------	-------

5.1 Land and Compensation Cost	Rp.	1,483 million	135 per US\$/ha
5.2 Survey and Design Costs (5 % of Item 5.3 (1))	Rp.	3,260 million	298 per US\$/ha
5.3 Construction Cost			< 10< 11 t
	70	OTAL NET AREA	6,185 HA
(1) Direct construction cost			4 100 1100 0
(i) Irrigation and drainage facilities	Rp.	45,100 million	4,120 per US\$ /ha
(ii) Flood prevention works	Rp.	11,500 million	1,050 per US\$ /ha
(iii) On-farm and land reclamation	Rp.	8,600 million	786 per US\$ /ha
Sub-total (1)	Rp.	65,200 million	5,956 per US\$/ha
(2) Physical contingency (30 % of Item (1))	Rp.	19,560 million	1,787 per US\$/ha
(3) Sub-total of Items (1)+(2)	Rp.	84,760 million	7,742 per US\$/ha
(4) Tax on Civil Works(VAT) (10 % of Item 5.3-(3))	Rp.	8,476 million	774 per US\$/ha
Total of Item 5.3	Rp.	84,760 million	7,742 per US\$/ha
5.4 Cost of the Consultants Services (10 % of total cost of Item 5.3-(1))	Rp.	6,520 million	596 per US\$/ha
5.5 Administration Cost of the Government (1 % of total cost of Item 5.3)	Rp.	848 million	77 per US\$/ha
(1 to or easing poor or recting pro)			
5.6 Price contingency	Rp.	0 million	0 per US\$/ha
5.7 Total Cost of the Project	Rp.	96,871 million	8,849 per US\$/ha

VI. IMPLEMENTATION SCHEDULE

6.1 Survey and design

2 Years

6.2 Construction schedule

4 Years

6.3 Executing agency

DGWRD-DPU

VII. PROJECT EVALUATION

7.1 Project Economic Cost	Rp.	77,715 million
7.2 Project Annual Economic Benefit		10 200 million

(1) Irrigation development(2) Flood protection works

Rp. 10,300 million Rp. 800 million

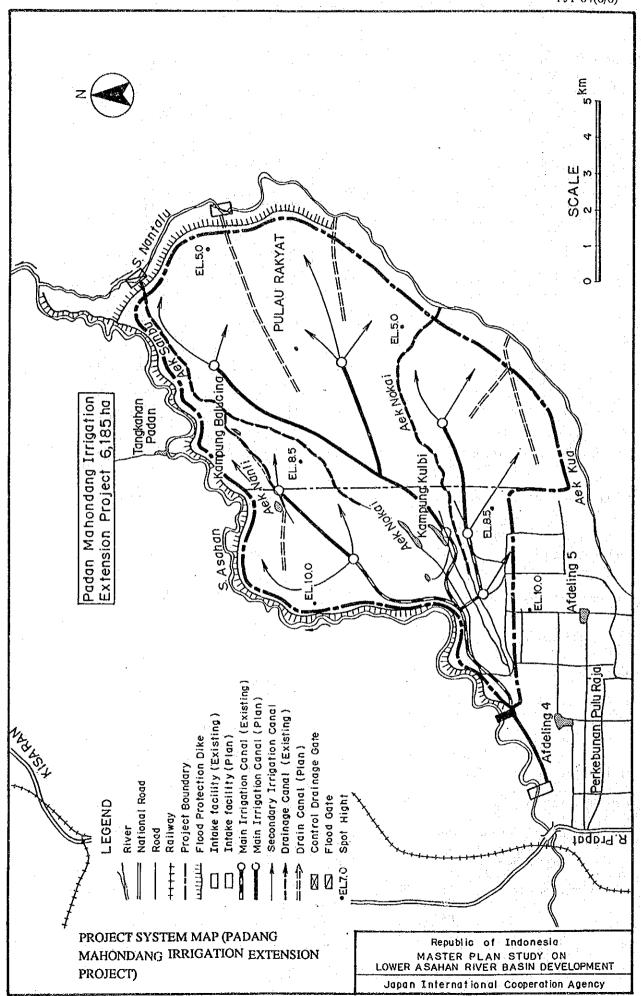
7.3 Economic viability

EIRR:

12.2 %

B/C :

1.21 (at 10 %)



I. SUMMARY

1.1 Name of Project: LEIDONG ASAHAN SWAMP DEVELOPMENT PROJECT

1.2 Type of Project: Irrigation and drainage development / Swamp development

1.3 Location:

Kabupaten:

Asahan / L.Batu

Kecamatan:

Pulau Rakyat, Sei Kepayang/ Kualuh Hilir,

Kualuh Hulu

1.4 Project Area:

62,100 ha in gross

1.5 Proposed Agricultural Development Plan

- Proposed cropping pattern

Doble crop of paddy (Existing sawah)

Oil palm plantation

- Cropping intensity of irrigated paddy

200 %

- Irrigation area

16.800 ha in net

- Non irrigation area

45,300 ha

1.6 Proposed Key Facilities

 i) Irrigation water supply to the rainfed sawa area located along the coastal line by constructing the diversion structure on the Asahan river and the Asahan-Leidong Link Canal.

ii) Provision of irrigation and drainage networks for the existing rainfed sawa.

iii) Land reclamation and drainage networks in the Asahan swamp for oil palm plantation.

iv) Improvement of land transportation condition for the coastal areas by constructing a coastal link road between Tg. Balai and Aek Kanopan.

1.7 Project Financial Cost

Rp. 657,000 million

(Price contingency is not included)

Rp. 84,000 million

1.8 Economic Annual

Incremental Project Benefit

8.5 %

EIRR: 8. B/C: 0.

0.8 at 10% interest rate

1.10 Proposed Implementation Period:

(including study, design and fund arrangement period)

16 years

II. PRESENT CONDITIONS OF THE PROJECT AREA

2.1 Socio-economic Conditions in 1988

(1)Total population54,300 persons(2)Number of farm household10,600 nos(3)Family size(average)5.1 persons

(4) Land holding size (average)
(5) Income level(average)
1.6 ha/farm household
Rp. 0.76 mil./household/year

2.2 Natural Conditions

(1) Soil condition: Fine textured soils and organic soils (peat)

(2) Topography : Flat (3) Altitude : El. 7-2 m

(4) Annual rainfal: 2,435 mm/year (5) 5-year low rainfall: 2,134 mm/year

2.3 Agricultural Activities

Cropping area and unit yield of Paddy

Sub-area	WP	DP	RP	Total
(Cropping area	, ha)	**		
	50	30	15,880	15,960
(Unit yield, ton	/ha)			
	5.0	5.0	2.0	

WP: Irrigated Wet Season Paddy
DP: Irrigated Dry Season Paddy
RP: Rainfed paddy field

(2) Use of fertilizer : Limited
(3) Use of chemicals : Common
(4) Use of farm machinery : Non

(5) Present land use (ha in Gross)

Sub-area	Irrigated Sawah	Rainfed Sawah	Swamp area	Others	Total
(PU area)					
1 DP Lebah	50	3.150	3,000	0	6,200
2 DP Leidong	0	13,400	2,600	0	16,000
(Non-PU area)	٠.				
3 Sei Payuh	0	3,300	4.100	. 0	7,400
4 Kupayang swamp	0	0	12,000	0	12,000
5 Leidong Left Swamp	0	0	11,500	0	11,500
6 Leidong Right Swamp	0	0	9,000	0	9,000
Total	50	19,850	42,200	0	62,100

2.4 Existing Infrastructure

(1) Irrigation and drainage facilities

Sub-arca	Irrigation canal (km)	Drainage canal (km)	Farm road (km)	Flood dike (km)	Related structures (nos)
DP Lebah DP Leidong	1.5 0.0	1.0 0.0	0.0 0.0	0.0	5.0 0.0
 Total	1.5	1.0	0.0	0.0	0.0

(2)	Domestic water supply	
(3)	Electric supply	
(4)	Other key facilities	

2.5 Flood Conditions

(1) Area affected by flood : 10,300 ha (standing water depth more than 30 cm for more than 1 day)
 (2) Degree of flood :

(i) Average stand.water depth : (ii) Average duration :

0.6 m 7 days

III. MAIN CONSTRAINTS OF THE AREA

- (#) Lack of irrigation water supply
- (#) Suffered by seasonal river flooding
- (#) Pest and diseases
- (#) Poor drainability
- (#) Others, if any; Poor Accesibility

4.1 Agricultural Development Plan

(1)	:	Land	use i	plan
1.4	,	Land	usv	hian

				<u>.</u>	unit: ha)
· · · · · · · · · · · · · · · · · · ·		La	nd Use Plan	<u> </u>	
Present land use	Net Irrigated	let Rainfed	Oil Palm	Others*	Total
1 1	Sawah	Sawah			
Irri. Sawah	50	_	· _		50
Rainfed Sawah	15,880	_		3,970	19,850
Oil Palm	0		: _	·	0
Swamp	870		28,810	12,520	42,200
Others	0		<u> </u>		. 0
Total	19,600	. i	28,810	16,490	62,100

^{*} Others includes canals, roads, house yard, etc.

(2) Cropping pattern:

Double cropping of paddy in Irrigated Sawah Oil Palm Planting in reclaimed area from swamp

(3) Cropping intensity:

200 % (Paddy field)

(4) Target yield

(i) Wet season paddy:

5.0 ton/ha

(ii) Dry season paddy:

5.0 ton/ha

(iii) Other crop(Oil Palm) :

22 ton/ha/year

- 4.2 Related development plan
 - (1) Development plan of DPU in Pelita V

- Non -

(2) Transmigration program

(i) Objective area

870 ha in net paddy field and 28,800 ha in net of oil Palm land

(ii) Numbers of transmigrates; 15,200 families

River improvement works

(i) The design of flood prevention dike of the Lebah river has been completed in June 1989 under the urgent flood control project for the Asahan river.

4.3 Proposed Project Works

(1) Principal Features of Project Works

(i) Irrigation system

- Water source development	· A	Asahan River	*:	
- Diversion structure		Asahan weir		*
- Irrigation canals	New:	772 km,	li Improved:	1 km
(ii) Drainage canals	New:	1,112 km,	It Improved:	
(iii) Flood protection dike	New:	29 km,	In Improved:	0 km
(iv) Farm road	New:	1,884 km,	It Improved:	25 km
(v) On-farm facilities		45,610 ha		
(vi) Land reclamation of swamp area		29,680 ha		

() Others:

V. PROJECT COST ESTIMATE (FINANCIAL COST)

5.1 Land and Compensation Cost	Rp.	5,536 million	186 per US\$/ha
5.2 Survey and Design Costs (5 % of Item 5.3 (1)) 5.3 Construction Cost	Rp.	22,265 million	749 per US\$/ha
	OTAL IRRI.	NET AREA	16,800 HA
(1) Direct construction cost	1.0		
(i) Irrigation and drainage facilities	Rp.	215,100 million	7,233 per US\$ /ha
(ii) Flood prevention works	Rp.	8,200 million	276 per US\$ /ha
(iii) On-farm and land reclamation	Rp.	128,500 million	4,321 per US\$ /ha
(iv) Trunk roads	Rp.	93,500 million	3,144 per US\$/ha
Sub-total (1)	Rp.	445,300 million	14,975 per US\$/ha
(2) Physical contingency (30 % of Item (1))	Rp.	133,590 million	4,493 per US\$/ha
(3) Sub-total of Items (1)+(2)	Rp.	578,890 million	19,468 per US\$/ha
(4) Tax on Civil Works(VAT) (10 % of Item 5.3-(3))	Rp.	57,889 million	1,947 per US\$/ha
Total of Item 5.3	Rp.	578,890 million	19,468 per US\$/ha
5.4 Cost of the Consultants Services (10 % of total cost of Item 5.3-(1))	Rp.	44,530 million	1,498 per US\$/ha
5.5 Administration Cost of the Government (1 % of total cost of Item 5.3)	Rp.	5,789 million	195 per US\$/ha
5.6 Price contingency	Rp.	0 million	0 per US\$/ha
5.7 Total Cost of the Project	Rp.	657,010 million	22,095 per USS/ha
AT TAKEN PARENTEA TROOM COMPENSATION			•
VI. IMPLEMENTATION SCHEDULE			

6.1 Survey and design 4 Years

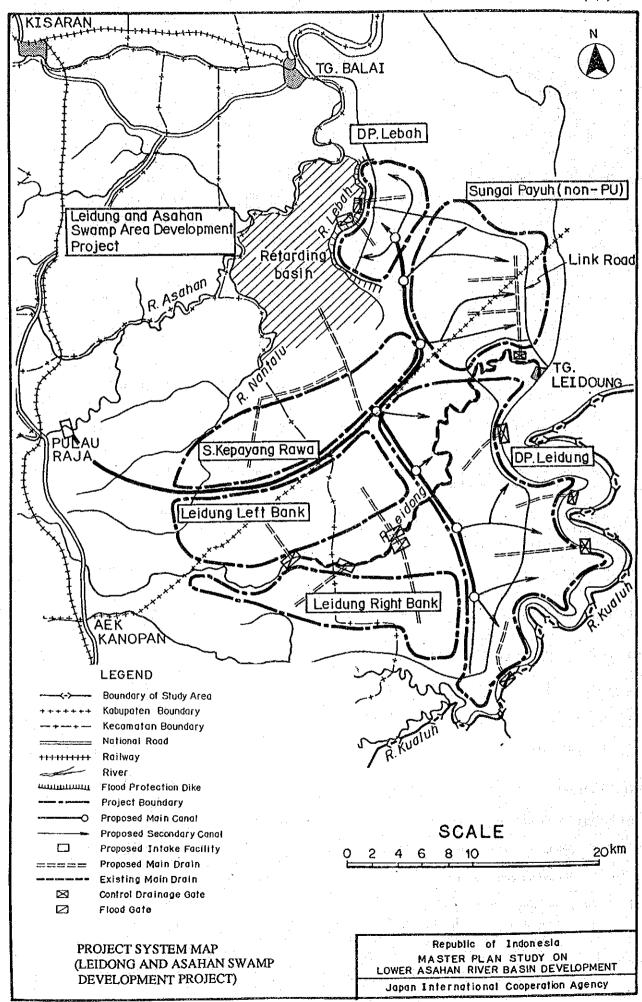
6.2 Construction schedule 12 Years

6.3 Executing agency DGWRD-DPU

VII. PROJECT EVALUATION

7.1 Project Economic Cost	Rp.	521,180 million	
7.2 Project Annual Economic Benefit			
(1) Irrigation development	Rp.	83,999 million	
(2) Flood protection works	Rp.	623 million	
7.3 Economic viability		•	

8.5 % 0.8 (at 10 %)



I. SUMMARY

1.1 Name of Project: KANOPAN LEFT BANK DRAINAGE IMPROVEMENT

PROJECT

1.2 Type of Project: Drainage improvement / Swamp development

1.3 Location:

Kabupaten:

L.Batu

Kecamatan:

Kualuh Hulu

1.4 Project Area:

5,800 ha in gross

1.5 Proposed Agricultural Development Plan

Proposed cropping pattern

Single crop of paddy a year

Cropping intensity

100 %

Irrigation area

4,300 ha in net

Non irrigation area

1,500 ha

1.6 Proposed Key Facilities

i) Flood control and drainage improvement of existing paddy area by constructing a flood prevention dike and drainage canals with control structures.

ii) Land reclamation of swamp land

iii) Betterment of accessibility in the project area by constructing road net work

1.7 Project Financial Cost

(Price contingency is not included)

Rp. 26,000 million

1.8 Economic Annual

Rp. 2,630 million

Incremental Project Benefit

1.9 Economic Viability

EIRR:

11.3 %

B/C:

1.14 at 10 % interest rate

1.10 Proposed Implementation Period : (including study, design and fund

5 years

arrangement period)

II. PRESENT CONDITIONS OF THE PROJECT AREA

2.1 Socio-economic Conditions in 1988

(1) Total population 5,300 persons
(2) Number of farm household 1,000 nos

(3) Family size(average) 5.2 persons

(4) Land holding size (average)
(5) Income level(average)

1.8 ha/farm household

Rp. 0.76 mil./household/year

2.2 Natural Conditions

(1) Soil condition: Fine textured soils, partly covered with peat and peat soil

(2) Topography : Flat

(3) Altitude El. 12-2 m

(4) Annual rainfal : 2,630 mm/year (5) 5-year low rainfall : 2,219 mm/year

2.3 Agricultural Activities

(1) Cropping area and unit yield of Paddy

Sub-area	WP	DP	RP	Total
(Cropping area	, ha)			
	-	- 1	2,064	2,064

(Unit yield, ton/ha)

2.0

WP: Irrigated Wet Season Paddy
DP: Irrigated Dry Season Paddy
RP: Rainfed paddy field

(2) Use of fertilizer : Limited (3) Use of chemicals : Common (4) Use of farm machinery : Non

(5) Present land use (ha in Gross)

	:		*.**		
Sub-area	Irrigated Sawah	Rainfed Sawah	Swamp arca	Others	Total
(PU area) 1 DP Suka Rame Suka Sari	0	950	550	0	1,500
2 DP Sono Martani	0	780	2,220	0	3,000
(Non-PU area)					
3 Lower Sono Martani	0	850	450	0	1,300
Total	0	2,580	3,220	0	5,800

2.4 Existing Infrastructure

Irrigation and drainage facilities (1)

Sub-area	Irrigation canal (km)	Drainage canal (km)	Farm road (km)	Flood dike (km)	Related structures (nos)
1. DP. Suka Rame/Sar:	0	6.0	0	. 0	0
2. DP. Sono Martani:	0	44.6	• 0 .	0	0
Total	0	50.6	0	C	0

(2)	Domestic water supply	
(3)	Electric supply	
(4)	Other key facilities	

2.5 Flood Conditions

(1) Area affected by flood : 4,400 ha (standing water depth more than 30 cm for more than 1 day) Degree of flood :

(2)

(i) Average stand.water depth:
(ii) Average duration:

0.5 m

7 days

III. MAIN CONSTRAINTS OF THE AREA

()	Lack of irrigation water supply
(#)	Suffered by seasonal river flooding
()	Pest and diseases

(#) Poor drainability

Others, if any

4.1 Agricultural Development Plan

	2000		_
(1)	Land	use	nlan

				(1	<u>unit: ha) </u>
		La	nd Use Plan		
Present land use	Net Irrigated	let Rainfed	Oil Palm	Others*	Total
	Sawah	Sawah			<u> </u>
Irri. Sawah					0
Rainfed Sawah	· _	2,064		516	2,580
Swamp		2,256		964	3,220
Others					0
Total	0	4,320		1,480	5,800

^{*} Others includes canals, roads, house yard, etc.

(2) Cropping pattern: Single cropping of paddy a year

Cropping intensity: 100 % (3)

(4) Target yield

4.0 ton/ha (i) Wet season paddy : (ii) Dry season paddy ton/ha (iii) Other crop : ton/ha

4.2 Related development plan

- Development plan of DPU in Pelita V (1)
 - Non -
- (2) Transmigration program

(i) Objective area : 2,250 ha in net

(ii) Numbers of transmigrates ; 2,200 families

- (3) River improvement works - Non -
- 4.3 Proposed Project Works
 - Principal Features of Project Works (1)

Time part catalog of Froject works		÷.		
(i) Drainage canals	New:	85 km,	Improved:	0 km
(ii) Flood protection dike	New:	11 km,	Improved:	0 km
(iii) Farm road	New:	85 km,	Improved:	0 km
			-	

(iv) On-farm facilities 4,320 ha (v) Land reclamation of swamp area 2,260 ha

() Others;

V. PROJECT COST ESTIMATE (FINFANCIAL COST)

		the contract of the contract o		:	· ·
5.1	Land a	nd Compensation Cost	Rp.	419 million	55 per US\$/ha
5.2	Survey	and Design Costs (5 % of Item 5.3 (1))	Rp.	865 million	113 per US\$/ha
5.3	Constri	action Cost			
			TC	TAL IRRI, NET ARI	4,320 HA
	(1)	Direct construction cost		1.	
	(i)	Drainage facilities	Rp.	8,100 million	1,059 per US\$ /ha
·	(ii)	Flood prevention works	Rp.	3,300 million	432 per US\$ /ha
1	(iii)	On-farm work and land reclamati	Rp.	5,900 million	772 per US\$ /ha
		Sub-total (1)	Rp.	17,300 million	2,263 per US\$/ha
	(2)	Physical contingency (30 % of Item (1))	Rp.	5,190 million	679 per US\$/ha
; ; ;	(3)	Sub-total of Items (1)+(2)	Rp.	22,490 million	2,941 per US\$/ha
	(4)	Tax on Civil Works(VAT) (10 % of Item 5.3-(3))	Rp.	2,249 million	294 per US\$/ha
: •		Total of Item 5.3	Rp.	22,490 million	2,941 per US\$/ha
į					* *
5.4	Cost of	the Consultants Services (10 % of total cost of Item 5.3-(1))	Rp.	1,730 million	226 per US\$/ha
5.5	Admin Govern	istration Cost of the	Rp.	225 million	29 per US\$/ha
:	00.00	(1 % of total cost of Item 5.3)			. •
5.6	Price co	ontingency	Rp.	0 million	0 per USS/ha
5.7	Total (Cost of the Project	Ŕp.	25,729 million	3,365 per US\$/ha

VI. IMPLEMENTATION SCHEDULE

6.1 Survey and design 2 Years
6.2 Construction schedule 3 Years

6.3 Executing agency DGWRD-DPU

VII. PROJECT EVALUATION

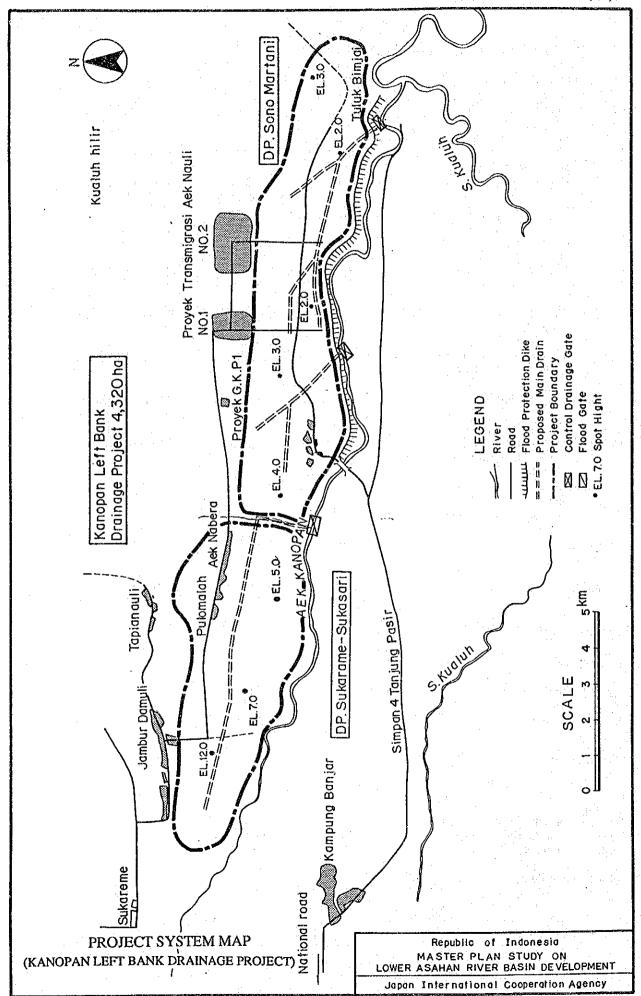
7.1 Project Economic Cost Rp. 20,250 million

7.2 Project Annual Economic Benefit
(1) Irrigation development Rp. 2,640 million
(2) Flood protection works Rp. 464 million

7.3 Economic viability

EIRR: 11.3 %

B/C: 1.14 (at 10 %)



I. SUMMARY

1.1 Name of Project : AEK NATAS IRRIGATION PROJECT

1.2 Type of Project: Irrigation and drainage development / Swamp development

1.3 Location:

Kabupaten:

L.Batu

Kecamatan:

Aek Natas

1.4 Project Area:

5,500 ha in gross

1.5 Proposed Agricultural Development Plan

Proposed cropping pattern

Double cropping of paddy

Cropping intensity

200 %

Irrigation area

4,200 ha in net

Non irrigation area

1,300 ha

1.6 Proposed Key Facilities

i) Irrigation water supply system consisting of a diversion structure on the A. Natas and irrigation networks.

ii) Drainage improvement of low-lying area by rehabilitation, construction of drainage network and flood protection dike

iii) Land reclamation of swamp area.

iv) Construction of farm road network in the area.

1.7 Project Financial Cost

Rp. 64,000 million

(Price contingency is not included)

Rp. 6,970 million

1.8 Economic Annual Incremental Project Benefit

1.9 Economic Viability

EIRR:

11.2 %

B/C:

1.12 at 10% interest rate

1.10 Proposed Implementation Period: (including study, design and fund

5 years

arrangement period)

II. PRESENT CONDITIONS OF THE PROJECT AREA

2.1 Socio-economic Conditions in 1988

4,800 persons Total population (1)930 nos Number of farm household (2)

5.2 persons (3) Family size(average)

1.8 ha/farm household Land holding size (average) 0.76 mil./household/year Rp. (5)Income level(average)

2.2 Natural Conditions

Medium to fine textured soils and peat soils Soil conditions : (1)

(2)Topography Flat Altitude El. 10-5 m

(3)

Annual rainfall 2,751 mm/year (4) 2,258 mm/year 5-year low rainfall :

2.3 Agricultural Activities

(1) Cropping area and unit yield of Paddy

Sub-area	WP	DP	RP	Total
(Cropping area,	ha)			
	· - · · ·		2,704	2,704

(Unit yield, ton/ha)

2.0

RP: Rainfed paddy field WP: Irrigated Wet Season Paddy DP: Irrigated Dry Season Paddy

(2) (3) Use of fertilizer : Limited Use of chemicals : Common

Use of farm machinery: Non (4)

Present land use (ha in Gross) (5)

•							
	Sub-area	Irrigated Sawah	Rainfed Sawah	Swamp area	Others	Total	
(PU area)		0	0.510		0.50	4.500	
1 DP Aek Natas		0		1,610	350	4,500	
2 DP Tapian Nauli	i	0	840	110	50	1,000	
•				$(x^{\frac{1}{2}},x^{\frac{1}{2}},x^{\frac{1}{2}},x^{\frac{1}{2}},x^{\frac{1}{2}}) \in \mathcal{F}$			
				100	7.4.77		
Total		0	3,380	1,720	400	5,500	

2.4 Existing Infrastructure

(1) Irrigation and drainage facilities

Sub-area	Irrigation canal (km)	Drainage canal (km)	Farm road (km)	Flood dike (km)	Related structures (nos)
1. D.P. Ack Natas 2. D.P. Tapiav Naul	0.0	10.7 16.0	0.0	15.0 0.0	0.0
Total	0.0	26.7	0.0	15.0	0.0

- (2) Domestic water supply
- (3) Electric supply
- (4) Other key facilities

2.5 Flood Conditions

- (1) Area affected by flood : 4,400 ha (standing water depth more than 30 cm for more than I day)
- (2) Degree of flood
 - (i) Average stand.water depth :

0.5 m

(ii) Average duration :

7 days

III. MAIN CONSTRAINTS OF THE AREA

- (#) Lack of irrigation water supply
- (#) Suffered by seasonal river flooding
- () Pest and diseases
- (#) Poor drainability
- () Others, if any ;

Poor accessibility

4.1 Agricultural Development Plan

					٠.	
(1)	1	La	เทศ	use	n	ıαn
	,		TATEL	use		

		· ·		(1	<u>unit: ha)</u>
gradien der Steiner	<u> </u>	La	nd Use Plan		
Present land use	Net Irrigated Net I Sawah Sa	Rainfed wah	Oil Palm	Others*	Total
Irri, Sawah	_			—	0
Rainfed Sawah	2,704	_		676	3,380
Swamp	1,206			514	1,720
Others	280	· · · · · ·		120	400
Total	4,190	0	0_	1,310	5,500

^{*} Others includes canals, roads, house yard, etc.

Cropping pattern : Double crop of paddy a year (2)

Cropping intensity: 200 % (3)

(4) Target yield

(i) Wet season paddy : 5.0 ton/ha (ii) Dry season paddy : (iii) Other crop : 5.0 ton/ha ton/ha

4.2 Related development plan

Development plan of DPU in Pelita V (1)

- Non -

(2)

Transmigration program (i) Objective area : 1,200 ha in net

- (ii) Numbers of transmigrates ; 1,200 families
- River improvement works (3) - Non -

4.3 Proposed Project Works

Principal Features of Project Works

(i) Irrigation system

 Water source development 	N:	atas River		
- Diversion structure	N:	atas Weir		
- Irrigation canals	New:	147 km,	Improved:	0 km
(ii) Drainage canals	New:	78 km,	Improved:	8 kn
(iii) Flood protection dike	New:	16 km,	Improved:	0 kn
(iv) Farm road	New:	225 km,	Improved:	8 kn
(v) On-farm facilities		4,190 ha		
(vi) Land reclamation of swamp area		1,490 ha		

() Others;

V. PROJECT COST ESTIMATE (FINANCIAL COST)

5.1 Land	and Compensation Cost	Rp.	1,782 million	240 per US\$ ha
	y and Design Costs (5 % of Item 5.3 (1)) ruction Cost	Rp.	2,130 million	287 per US\$ ha
J.J Collst		TAL IRRI.	NET AREA	4,190 HA
(1)	Direct construction cost		•	
(i)		Rp.	30,300 million	4,086 per US\$ /ha
(ii)		Rp.	6,800 million	917 per US\$ /ha
(iii)	On-farm and land reclamation	Rp.	5,500 million	741 per US\$ /ha
	Sub-total (1)	Rp.	42,600 million	5,744 per US\$ ha
(2)	Physical contingency (30 % of Item (1))	Rp.	12,780 million	1,723 per US\$ ha
(3)	Sub-total of Items (1)+(2)	Rp.	55,380 million	7,467 per US\$ ha
(4)	Tax on Civil Works(VAT) (10 % of Item 5.3-(3))	Rp.	5,538 million	747 per US\$ ha
	Total of Item 5.3	Rp.	55,380 million	7,467 per US\$ ha
5.4 Cost o	of the Consultants Services (10 % of total cost of Item 5.3-(1))	Rp.	4,260 million	574 per US\$ ha
	nistration Cost of the	Rp.	554 million	75 per US\$ ha
	(1 % of total cost of Item 5.3)			
5.6 Price	contingency	Rp.	0 million	0 per US\$ ha
5.7 Total	Cost of the Project	Rp.	64,106 million	8,644 per US\$ ha
			-	

VI. IMPLEMENTATION SCHEDULE

6.1 Survey and design 2 Years

6.2 Construction schedule 3 Years

6.3 Executing agency DGWRD-DPU

VII. PROJECT EVALUATION

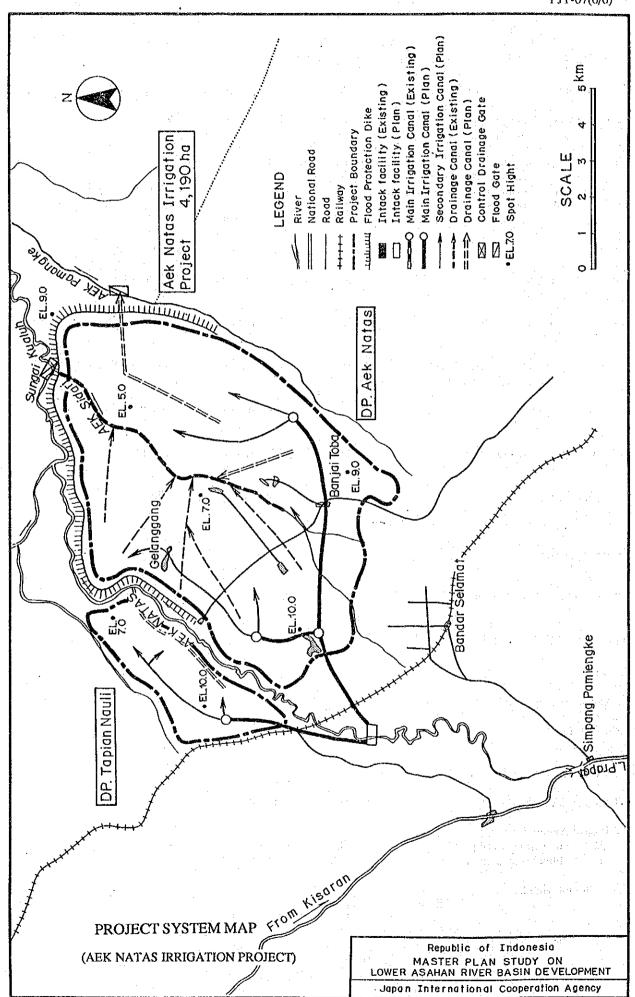
7.1 Project Economic Cost Rp. 49,860 million

7.2 Project Annual Economic Benefit
(1) Irrigation development Rp. 6,970 million
(2) Flood protection works Rp. 482 million

7.3 Economic viability

EIRR: 11.2 %

B/C : 1.12 (at 10 %)



I. SUMMARY

1.1 Name of Project: KUALUH RIGHT BANK IRRIGATION PROJECT

1.2 Type of Project: Irrigaiton and drainage development / Swamp development

1.3 Location:

Kabupaten:

L. Batu

Kecamatan:

Kaluh Hulu

1.4 Project Area:

3,100 ha in gross

1.5 Proposed Agricultural Development Plan

- Proposed cropping pattern

Double cropping of paddy

- Cropping intensity

200 %

- Irrigation area

2,400 ha in net

- Non irrigation area

700 ha

1.6 Proposed Key Facilities

i) Irrigation development of the area by constructing a devision structure on the Kualuh river and irrigation canal network.

ii) Drainage improvement by constructing a flood protection dike and drainage cannal net work.

iii) Land reclamation of swamp area.

iv) Improvement of farm road networks in the area.

1.7 Project Financial Cost

Rp. 40,500 million

(Price contingency is not included)

1.8 Economic Annual

Rp. 3,930 million

Incremental Project Benefit

1.9 Economic Viability

EIRR:

10.1 %

B/C:

1.01 at 10 % interest rate

1.10 Proposed Implementation Period: (including study, design and fund arrangement period)

5 years

II. PRESENT CONDITIONS OF THE PROJECT AREA

2.1 Socio-economic Conditions in 1988

3,100 persons 590 nos Total population (1)Number of farm household (2)

5.2 persons Family size(average) (3)

1.4 ha/farm household Land holding size (average) (4) 0.76 mil./household/year Rp. Income level(average) (5)

2.2 Natural Conditions

Medium textured soils (1) Soil conditions

Flat (2)Topography

(3) Altitude El. 10-6 m Annual rainfall 2630 mm/year (4) 2219 mm/year (5) 5-year low rainfall :

2.3 Agricultural Activities

(1) Cropping area and unit yield of Paddy

Sub-area WP	DP	RP	Total
(Cropping area, ha)			
		2,040	2,040

(Unit yield, ton/ha)

2.0

WP: Irrigated Wet Season Paddy RP: Rainfed paddy field

DP: Irrigated Dry Season Paddy

Limited (2)Use of fertilizer: (3) (4) Use of chemicals: Common

Use of farm machinery: Non

Present land use (ha in Gross) (5)

Sub-area	Irrigated Sawah	Rainfed Sawah	Swamp area	Others	Total
(Non-PU area) 2 Kp.Saga	0	2,550	550	0	3,100
Total	0	2,550	550	0	3,100

2.4 Existing Infrastructure

Irrigation and drainage facilities (1)

Cub area		Drainage	Farm	Flood	Related
Sub-arca	canal.	canal	road	dike	structures
	(km)	(km)	(km)	(km)	(nos)

- Non -

(2)	Domestic water supply	
(3)	Electric supply	
(4)	Other key facilities	:

2.5 Flood Conditions

Area affected by flood: 3,000 ha (standing water depth more than 30 cm for more than 1 day)
Degree of flood:

(2)

(i) Average stand water depth :

 $0.5 \, \mathrm{m}$

(ii) Average stand.water depth :

7 days

III. MAIN CONSTRAINTS OF THE AREA

/ m \	7 1 0			
(#)	Lack At	irrigation	water	CHIMIN
(")	Lack Ox	magation	W CILCI	Supply

- Suffered by seasonal river flooding Pest and diseases
- Poor drainability
- Others, if any

Lack of irrigation facilities

(1)	Land	use	plan
1.1	F2 (4+ F / 2		

				(<u>unit: ha)</u>
		La	nd Use Plan		
Present land use	Net Irrigated Sawah	Net Rainfed Sawah	Oil Palm	Others*	Total
Irri. Sawah	_				0
Rainfed Sawah	2,040		_	510	2,550
Swamp	385	. –	· · · · · ·	165	550
Others	0.			0	0
Total	2,425	0	0	675	3,100

^{*} Others includes canals, roads, house yard, etc.

(2) Cropping pattern : Double crop of paddy

(3) Cropping intensity: 200 %

(4) Target yield

(i) Wet season paddy : 5 ton/ha (ii) Dry season paddy : 5 ton/ha (iii) Other crop : 5 ton/ha

4.2 Related development plan

- (1) Development plan of DPU in Pelita V
- Non -
- (2) Transmigration program

(i) Objective area : 380

380 ha in net

- (ii) Numbers of transmigrates ; 300 families
- (3) River improvement works Non -

4.3 Proposed Project Works

(1) Principal Features of Project Works

(i) Irrigation system
- Water source development
- Diversion structure
- Irrigation canals

(iii) Flood protection dike

(ii) Drainage canals

(iv) Farm road

velopment

Kualuh River

Kualuh No.1 Weir (Upstream)

New: 85 km, Improved: 0 km

New: 61 km, Improved: 0 km

New: 19 km, Improved: 0 km

146 km,

Improved:

0 km

New:

(v) On-farm facilities2,425 ha(vi) Land reclamation of swamp area385 ha

() Others;

V. PROJECT COST ESTIMATE (FINANCIAL COST)

5.1	Land a	nd Compensation Cost	Rp.	1,156 million	269 per US\$/ha
	. •	and Design Costs (5 % of Item 5.3 (1))	Rp.	1,345 million	313 per US\$/ha
3.3	Constri	uction Cost	TOTAL IRE	I. NET AREA	2,425 HA
	(1)	Direct construction cost	TOTAL IIG	II, NET AKEA	2,723 1111
	(i)	Irrigation and drainage facilities	Rp.	20,500 million	4,776 per US\$ /ha
	(ii)	Flood prevention works	Rp.	3,400 million	792 per US\$ /ha
٠	(iii)	On-farm and land reclamation	Rp.	3,000 million	699 per US\$ /ha
₹.		Sub-total (1)	Rp.	26,900 million	6,267 per US\$/ha
\$	(2)	Physical contingency (30 % of Item (1))	Rp.	8,070 million	1,880 per US\$/ha
:	(3)	Sub-total of Items (1)+(2)	Rp.	34,970 million	8,147 per US\$/ha
	(4)	Tax on Civil Works(VAT) (10 % of Item 5.3-(3))	Rp.	3,497 million	815 per US\$/ha
į.		Total of Item 5.3	Rp.	34,970 million	8,147 per US\$/ha
	10		8		
5.4	Cost of	the Consultants Services (10 % of total cost of Item 5.3-(1)	Rp.	2,690 million	627 per US\$/ha
5.5		istration Cost of the	Rp.	350 million	81 per USS/ha
7	Govern	(1 % of total cost of Item 5.3)			
5.6	Price co	ontingency	Rp.	0 million	0 per US\$/ha
5.7	Total (Cost of the Project	Rp.	40,511 million	9,438 per US\$/ha

VI. IMPLEMENTATION SCHEDULE

6.1 Survey and design

2 Years

6.2 Construction schedule

3 Years

6.3 Executing agency

DGWRD-DPU

VII. PROJECT EVALUATION

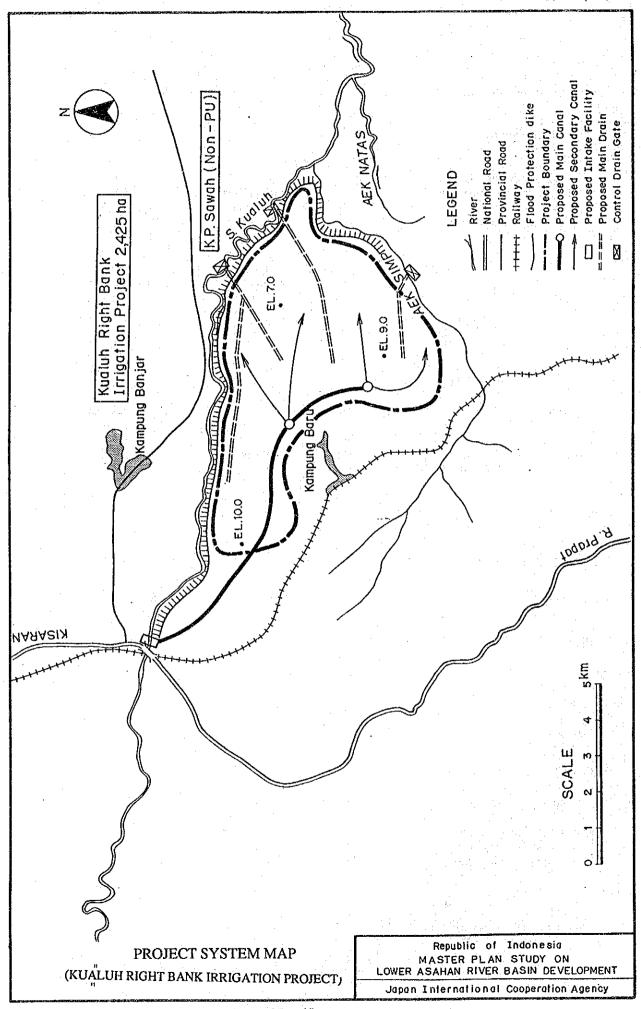
7.1 Project Economic Cost Rp.		31,485 million
7.2 Project Annual Economic Benefit		2 222 1111
(1) Irrigation development	Rp.	3,930 million
(2) Flood protection works	Rp.	302 million

7.3 Economic viability

EIRR:

10.1 %

B/C : 1.01 (at 10 %)



I. SUMMARY

1.1 Name of Project : AEK NAETEK IRRIGATION PROJECT

1.2 Type of Project: Irrigation and drainage development / Swamp development

1.3 Location:

Kabupaten:

L.Batu

Kecamatan:

Kaluh Hulu, Kualuh Hilir

1.4 Project Area:

4,500 ha in gross

1.5 Proposed Agricultural Development Plan

Proposed cropping pattern

Double cropping of paddy

Cropping intensity

200 %

Irrigation area

3,500 ha in net

Non irrigation area

1,000 ha

1.6 Proposed Key Facilities

i) Irrigation development by constructing a diversion structure on the Kualuh river and an irrigation canal network.

ii) Drainage improvement of the low-lying area by constructing drainage canals with tidal control structures, and flood prevention dikes.

iii) Land reclamation of swamp area.

iv) Construction of farm road network in the area

1,7 Project Financial Cost

Rp.59,000 million

(Price contingency is not included)

1.8 Economic Annual

Incremental Project Benefit

Rp. 5,760 million

1.9 Economic Viability

EIRR:

11.3 %

B/C:

1.13 at 10% interest rate

1.10 Proposed Implementation Period:

(including study, design and fund

arrangement period)

5 years

IL PRESENT CONDITIONS OF THE PROJECT AREA

2.1 Socio-economic Conditions in 1988

2,100 persons (1) Total population 410 nos (2) Number of farm household

5.1 persons Family size(average)

(3) 1.4 ha/farm household (4) Land holding size (average) Income level(average) Rp. 0.76 mil./household/year (5)

2,218 mm/year

2.2 Natural Conditions

Soil condition Fine textured soils and peat soil (1) (2)**Topography** Flat (3) Altitude El 7-3 m 2,630 mm/year (4) Annual rainfall

2.3 Agricultural Activities

(5)

(3)

Cropping area and unit yield of Paddy (1)

5-year low rainfall:

Sub-area	WP	DP	RP	Total
(Cropping area	, ha)			
			2,400	2,400

(Unit yield, ton/ha)

2.0 2.0

WP: Irrigated Wet Season Paddy RP: Rainfed paddy field DP: Irrigated Dry Season Paddy

Common

Use of fertilizer: Limited (2)

(4) Use of farm machinery: Non

(5) Present land use (ha in Gross)

Use of chemicals :

						1.1
	Sub-area	Irrigated Sawah	Rainfed Sawah	Swamp area	Others	Total
				."		
· .	DP Ack Nacctck	0	3,000	1,500	0	4,500
			:	1.4		
4.		:				
Total		0	3,000	1,500	0	4,500

2.4 Existing Infrastructure

(1) Irrigation and drainage facilities

 Sub-area	Irrigation canal (km)	Drainage canal (km)	Farm road (km)	Flood dike (km)	Related structures (nos)
DP Ack Nactek	0	15.6	0	36.5	0

(2)	Domestic water supply	
(3)	Electric supply	
(4)	Other key facilities	

2.5 Flood Conditions

(1) Area affected by flood : 3,000 ha (standing water depth more than 30 cm for more than 1 day)

(2) Degree of flood:

(i) Average stand.water depth :

 ~ 0.5 m

(ii) Average duration :

: 7 days

III. MAIN CONSTRAINTS OF THE AREA

- (#) Lack of irrigation water supply
- (#) Suffered by seasonal river flooding
- (#) Pest and diseases
- (#) Poor drainability
- (#) Others, if any; Poor Accessibility

4.1 Agricultural Development Plan

Land use plan	(1)	Land	use	plan
---------------------------------	-----	------	-----	------

				(1	ınit: ha)
		La	nd Use Plan		
Present land use	Net Irrigated Net Sawah	Vet Rainfed Sawah	Oil Palm	Others*	Total
Irri, Sawah				_	0
Rainfed Sawah	2,400		• _	600	3,000
Swamp	1,050			450	1,500
Others	·		·	· · · · · · · · · · · · · · · · · · ·	0
Total	3,450			1,050	4,500

^{*} Others includes canals, roads, house yard, etc.

Double cropping of paddy (2) Cropping pattern :

(3) (4) Cropping intensity: 200 %

Target yield

(i) Wet season paddy : 5.0 ton/ha 5.0 ton/ha (ii) Dry season paddy : ton/ha (iii) Other crop :

4.2 Related development plan

Development plan of DPU in Pelita V and VI (1)

- Non -

- Transmigration program (2)
 - 1,050 ha in net (i) Objective area:
 - (ii) Numbers of transmigrates ; 1,000 families
- River improvement works (3) - Non -

4.3 Proposed Project Works

Principal Features of Project Works (1)

() Irrigation system - Water source development	Kı	ıaluh River		
- Diversion structure	Ku	ıaluh No.2 wei	r(downstream)	
- Irrigation canals	New:	121 km,	Improved:	0 km
(ii) Drainage canals	New:	71 km,	Improved:	15 km
(iii) Flood protection dike	New:	17 km,	Improved:	0 km
(iv) Farm road	New:	192 km,	Improved:	15 km
(v) On-farm facilities		3,450 ha	*	
(vi) Land reclamation of swamp area		1,050 ha		

V. PROJECT COST ESTIMATE (FINANCIAL COST)

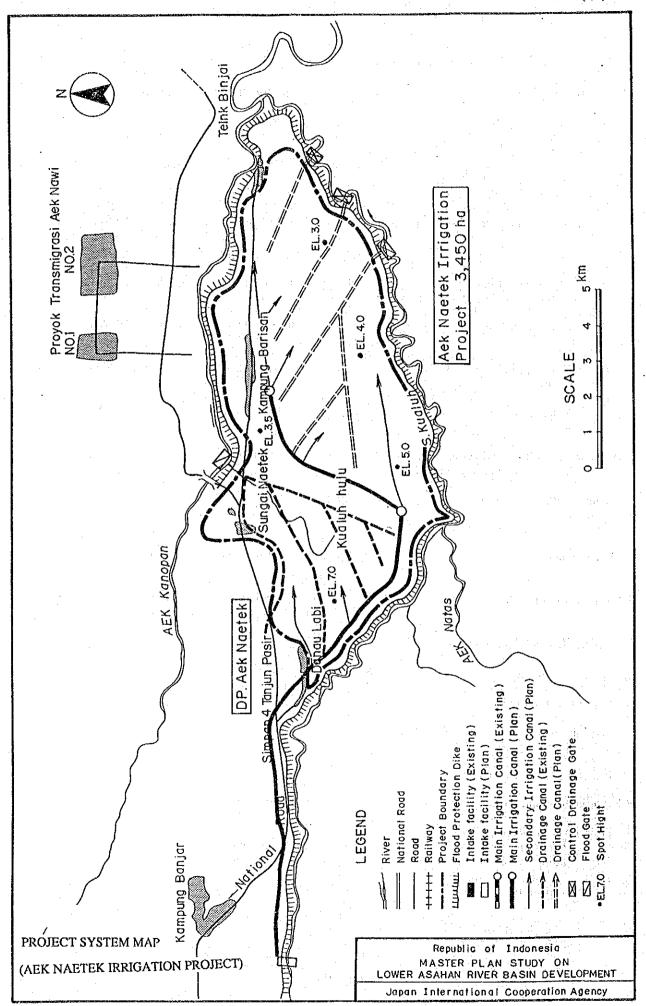
		(2.1.1.			•
5.1	Land a	nd Compensation Cost	Rp.	1,383 million	226 per US\$/ha
5.2	Survey	and Design Costs (5 % of Item 5.3 (1))	Rp.	1,960 million	321 per US\$/ha
5.3	Constru	action Cost	5		•
			OTAL IRRI.	NET AREA	3,450 HA
	(1)	Direct construction cost		.*	
	(i)	Irrigation and drainage facilities	Rp.	27,700 million	4,537 per US\$ /ha
:	(ii)	Flood prevention works	Rp.	7,100 million	1,163 per US\$ /ha
	(iii)	On-farm and land reclamation	Rp.	4,400 million	720 per US\$ /ha
	•	Sub-total (1)	Rp.	39,200 million	6,419 per US\$/ha
. 1	(2)	Physical contingency (30 % of Item (1))	Rp.	11,760 million	1,926 per US\$/ha
: ((3)	Sub-total of Items (1)+(2)	Rp.	50,960 million	8,345 per US\$/ha
((4)	Tax on Civil Works(VAT) (10 % of Item 5.3-(3))	Rp.	5,096 million	835 per US\$/ha
	.1	Total of Item 5.3	Rp.	50,960 million	8,345 per US\$/ha
5.4	Cost of	the Consultants Services (10 % of total cost of Item 5.3-(1))	Rp.	3,920 million	642 per US\$/ha
	Admini Govern	stration Cost of the ment (1 % of total cost of Item 5.3)	Rp.	510 million	83 per US\$/ha
56	Price co	ontingency	Rp.	0 million	0 per US\$/ha
J.0 1	i iioò oc	onting one y	wp.	· ·	o por continu
5.7	Total C	Cost of the Project	Rp.	58,733 million	9,618 per US\$/ha
VI.	IMPL	EMENTATION SCHEDULE			

VI. IMPLEMENTATION SCHEDULE

6.1 Survey and design	2 Years
6.2 Construction schedule	3 Years
6.3 Executing agency	DGWRD-DPU

VII. PROJECT EVALUATION

7.1 Proje	ct Economic Cost	Rp.	45,880 million
7.2 Proje (1) (2)	ct Annual Economic Benefit Irrigation development Flood protection works	Rp. Rp.	5,760 million 802 million
7.3 Econ	omic viability EIRR: B/C:	11.3 % 1.13 (a)	ı 10 %)



I. SUMMARY

1.1 Name of Project : SMALL-SCALE IRRIGATION REHABILITATION PACKAGE PROJECT

1.2 Type of Project: Rehabilitation works of irrigation facilities

1.3 Location: Kabupaten: Asahan / L.Batu

Kecamatan :

1.4 Project Area: 8,700 ha in gross

1.5 Proposed Agricultural Development Plan

- Proposed cropping pattern Double cropping of paddy

- Cropping intensity 170 %

- Irrigation area 7,200 ha in net

Non irrigation area 1,500 ha

1.6 Proposed Key Facilities

i) Rehabilitation and up-grading of existing irrigation facilities

1.7 Project Financial Cost Rp. 76,700 million (Price contingency is not included)

1.8 Economic Annual Rp. 7,453 million Incremental Project Benefit

1.9 Economic Viability EIRR: 11.5 % B/C: 1.03 at 10% interest rate

1.10 Proposed Implementation Period: 6 years (including study, design and fund

arrangement period)

II. PRESENT CONDITIONS OF THE PROJECT AREA

2.1 Socio-economic Conditions in 1988

(1)Total population12,500 persons(2)Number of farm household2,400 nos(3)Family size(average)5.2 persons(4)Land holding size (average)1.1 ha/farm household

(4) Land holding size (average) 1.1 ha/farm household (5) Income level(average) 1.2 mil./household/year

Rainfed Area Rp. 0.8 mil./household/year

2.2 Natural Conditions

(1) Soil condition : Fine textured Alluvial soils in narrow valley bottom

(2) Topography : Valley bottom and flat (3) Altitude : El. 50-10 m (4) Annual rainfall : 2,435 mm/year

(5) 5-year low rainfall : 2,134 mm/year (6) Drainage condition : Relatively good

2.3 Agricultural Activities

(1) Cropping area and unit yield of Paddy

Sub-area	WP	DP	RP	Total
(Cropping area	a, ha)			
	1,040	624	5,982	7,646
				•
(Unit yield, to	n/ha)		•	
(anii y zatu, za	3.5	3.5	2.5	

WP: Irrigated Wet Season Paddy
DP: Irrigated Dry Season Paddy
RP: Rainfed paddy field

(2) Use of fertifizer : Considerable in Irrigated area, common in Rainfed area

(3) Use of chemicals : Common(4) Use of farm machinery : Non

(5) Present land use (ha in Gross)

	<u> </u>		<u> </u>			
Sub-arca	Irrigated Sawah	Rainfed Sawah	Swamp area	Others	Total	
(PU area) 1 Irrigated small patches (11 patches)	1,155	1,760	0	0	2,915	
(Non-PU area)		.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	ing a second			
3 Silau river basin	0	2,100	0	0	2,100	
4 Bunut river basin	. 0	410	0	0	410	
5 Upper Silau (A=>500 ha), X 2	. 0	1,255	0	0:	1,255	
6 Upper Kualuh (A=>500 ha), X 3	0	2,020	0	0	2,020	
Total	1,155	7,545	0	0	8,700	

2.4 Existing Infrastrúcture

(1) Irrigation and drainage facilities

	Sub-area	 Irrigation canal (km)	Drainage canal (km)	Farm road (km)	Flood dike (km)	Related structures (nos)
1 DILL W	al Asshau	 38.6	2.5	0.0	0.0	41
	ab. Asahan ab. Lab. Batu	25.9	3.5 9.8	0.9	0.8	79
	Total	64.5	13.3	0.9	0.8	120

m	Domoetic	wotor	consid
(2)	Domestic	WAILDI	Suppry

- (3)
- Electric supply
 Other key facilities (4)

2.5 Flood Conditions

- (1) Area affected by flood ha (standing water depth more than 30 cm for more than 1 day)
 Degree of flood:

 (i) Average stand.water depth: m
- (2)

(ii) Average duration :

days

III. MAIN CONSTRAINTS OF THE AREA

•	#) I	שמח	α t	TEE	10.01	1011	water	cinn	11,
	11				111	ıĸaı	. 1 1 / 1 1 .	water	SUDD	* Y

- Suffered by seasonal river flooding
- Pest and diseases
- Poor drainability
- Others, if any ;

Deterioration of existing facilities

4.1 Agricultural Development Plan

(1)	Land	1100	nian
11/	17,011174	usv	Picture

				(unit: ha	<u>a)</u>
		La	nd Use Plan		
Present land use	Net Irrigated Sawah	Net Rainfed Sawah	Oil Palm	Others* Tot	al
		Sawan			
Irri, Sawah	1,040	-	-	115 1,15))
Rainfed Sawah	6,160		_	1,385 7,54	10
Swamp		-	,	gen Note of the	0
Others	0		_	. 0	0
Total	7,200			1,500 8,70)0

^{*} Others includes canals, roads, house yard, etc.

(2) Cropping pattern : Double Crop of Paddy

(3) Cropping intensity: 170 %

(4) Target yield

(i) Wet season paddy : 5.0 ton/ha (ii) Dry season paddy : 5.0 ton/ha (iii) Other crop : 5.0 ton/ha

4.2 Related development plan

(1) Development plan of DPU in Pelita V

- Non -

(2) Transmigration program

(i) Objective area : Non

(ii) Numbers of transmigrates; Non persons

(3) River improvement works - Non -

(iv) Farm road

(v) On-farm facilities (vi) Land reclamation

- 4.3 Proposed Project Works
 - (1) Principal Features of Project Works
 (i) Irrigation system

(-,
 Water source development
- Diversion structure
- Irrigation canals
(ii) Drainage canals
(iii) Flood protection dike
(i

	ach River 🐇		
E	ach Existing	Intake	. 4
New:	177 km	, Improved:	29 km
New:	128 km	i, Improved:	24 km
New:	0 km	, Improved:	0 km
New:	305 km	, Improved:	53 km
	7,200 ha		•
	0 ha		

() Others;		

V. PROJECT COST ESTIMATE (FINANCIAL COST)

5.1 Land and Compensation Cost	Rp.	1,830 million	145 per US\$/ha
5.2 Survey and Design Costs (5 % of Item 5.3 (1))	Rp.	2,560 million	202 per US\$/ha
5.3 Construction Cost	T	OTAL IRRI, NET ARI	7,150 HA
(1) Direct construction cost	. 10	JIAL IKKI, NEI AKI	7,130 HA
(i) Irrigation and drainage facilities	Rp.	42,800 million	3,382 per US\$ /ha
(ii) On-farm and land reclamation	Rp.	8,400 million	664 per US\$ /ha
Sub-total (1)	Rp.	51,200 million	4,046 per US\$/ha
(2) Physical contingency (30 % of Item (1))	Rp.	15,360 million	1,214 per US\$/ha
(3) Sub-total of Items (1)+(2)	Rp.	66,560 million	5,259 per US\$/ha
(4) Tax on Civil Works(VAT) (10 % of Item 5.3-(3))	Rp.	6,656 million	526 per US\$/ha
Total of Item 5.3	Rp.	66,560 million	5,259 per US\$/ha
5.4 Cost of the Consultants Services (10 % of total cost of Item 5.3-(1))	Rp.	5,120 million	405 per US\$/ha
5.5 Administration Cost of the Government (1 % of total cost of Item 5.3)	Rp.	666 million	53 per US\$/ha
5.6 Price contingency	Rp.	0 million	0 per US\$/ha
5.7 Total Cost of the Project	Rp.	76,736 million	6,063 per US\$/ha
· ·			

VI. IMPLEMENTATION SCHEDULE

6.1 Survey and design

2 Years

6.2 Construction schedule

4 Years

6.3 Executing agency

DGWRD-DPU

VII. PROJECT EVALUATION

7.1 Project Economic Cost

Rp.

59,520 million

7.2 Project Annual Economic Benefit

Irrigation development (1)

Flood protection works

Rp. Rp.

7,450 million 0 million

7.3 Economic viability

(2)

EIRR:

B/C :

11.5 % 1.03 (at 10 %)

